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What Drives U.S. Banking Mergers: Misvaluation, Gambling or Envy?

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WHAT DRIVES U.S. BANKING MERGERS: MISVALUATION, GAMBLING OR ENVY?

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ABSTRACT

WHAT DRIVES U.S. BANKING MERGERS:
OVERVALUATION, GAMBLING OR ENVY?

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The thesis consists of three essays that examine whether U.S. bank mergers are motivated by market inefficiency and managerial psychology biases. Essay I investigates equity misvaluation as a possible driver for United States banking mergers from the perspective of market inefficiency, and finds that bidders tend to use overvalued equity to buy undervalued targets. Essay II, motivated by the cumulative prospect theory of Tversky and Kahneman (1992), tests whether managerial gambling attitudes are linked with lottery characteristics of target banks (i.e., high skewness, high volatility, and low price). The evidence shows that banking acquisitions are influenced by gambling attitudes rooted into house money effects. Essay III examines whether managerial envy plays a key role in shaping merger waves. The empirical evidence shows that envy influences bank merger waves.

"Man is but a reed, the feeblest thing in nature; but he is a reed that thinks. ... Let us endeavor, then, to think well; this is the principle of morality."

- Blaise Pascal

This thesis is dedicated to anyone who likes critical thinking.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter I
Introduction

In the past more than twenty years, the U.S. banking industry experienced the biggest consolidation, which reduced the number of U.S. banks around a half. In the bank merger literature, various motivations of bidding banks have been investigated, including improving target operating performance, capitalization of the target firms, industry concentration, and deal size (Hernando et al., 2009). The thesis examines whether market overvaluation, managerial gambling attitude and envious psychology play a role in motivating the U.S. banks' merger activities.

Essay I (Chapter II) investigates misvaluation as a possible driver for United States banking mergers from the perspective of market inefficiency. In an inefficient market, stocks are mispriced, and there is information asymmetry between inside managers and outside investors. Rational managers are likely to take over other firms using their overvalued stocks. Our empirical evidence generally supports the misvaluation hypothesis. Bidder and target valuations (price-to-book or price-to–residual income model value) are related to the method of payment, premium, and bidder and target announcement-period returns. This study also finds new evidence for the monitoring hypothesis. Acquiring private banks, which have relatively concentrated ownership compared with public banks, using stock increases bidders' wealth. Diversification effects are also tested. Consistent with Delong (2001), geographic and activity diversification is found to decrease bidders' wealth, as reflected in bidders' negative abnormal returns around the merger announcement, but increase targets' wealth.

Essay II (Chapter III) investigates the asset pricing implications of the cumulative prospect theory in the context of U.S. bank acquisitions, with particular emphasis on its probability weighting component. It hypothesizes that gambling attitudes matter for banking takeover decisions and analyzes takeover announcements for public U.S. targets from 1985 to 2006. The evidence demonstrates that the offer price premium is higher when the target bank has characteristics similar to those of lottery tickets (high skewness, high volatility, and low price). In addition, target announcement returns are found to be higher in lottery-type acquisitions. Consistent with our expectations, bidder announcement returns and synergies are irrelevant to the

lottery characteristics of the target. The patterns we document are stronger when bidding firms are bigger, target firms are smaller, investor sentiment is above the median, and the Chicago Fed National Activity Index is negative. Consistent with the house money effect of Thaler and Johnson (1990), bank managers are more prone to readily accept risk when the pain of potential losses is cushioned by prior gains. Overall, the results indicate that banking acquisitions are influenced by gambling attitudes.

Essay III (Chapter IV) tests whether chief executive officer (CEO) envy plays an important role in shaping U.S. bank merger waves. Since managerial benefits, especially compensation, always increase with firm size, we conjecture that bank CEOs easily rush into acquisitions due to their envious psychology once other bank CEOs initiate them. Five empirical predictions—concerning bidder (target) size, transaction size, value creation for the bidders, compensation increases for top managers, as well as total gains (synergies) from bank mergers—are made and generally empirically supported. We view envy as the key driving force behind these empirical results.

All these analysis aim to highlight the extent to which the resolutions of U.S. bank mergers can be influenced by market inefficiency and managerial psychology biases. The empirical evidence show these factors cause different impacts on the decision making of U.S. banks, as well as the formulation of bank merger waves.

Chapter II

Misvaluation and the United States Banking Mergers

2.1 Introduction

In the 1990s, the United States and world economies experienced a large wave of mergers and acquisitions (Andrade, 2001). The U.S. banking industry has been consolidating rapidly: the number of U.S. commercial banks fell from about 14,000 in 1980 to about 7,000 by the end of 2008,[1] the vast majority of this being due to acquisitions, rather than bank failures. Banking and financial services has consistently ranked in the top five of all industries in the number of merger transactions taking place each year. From 1980 to 2003, the share of assets held by the ten largest commercial banks (ranked by assets) rose from 22% to 46%, while the share of deposits held by the ten largest commercial banks (ranked by deposits) rose from 19% to 41%.[2]

In the bank merger literature, various motivations of bidding banks have been investigated, including improving target operating performance, capitalization of the target firms, industry concentration, and deal size (Hernando et al., 2009). But the recent debate about the cause of merger waves has highlighted the fact that merger waves are correlated with high stock market valuations (e.g., see Shleifer and Vishny (2003), Dong et al. (2006)). The misvaluation hypothesis (Shleifer and Vishny, 2003) holds that market inefficiency has important effects on takeover activity. Bidders attempt to profit by buying undervalued targets for cash at a price below fundamental value or by paying equity for targets that, even if overvalued, are less overvalued than the bidders (Dong et al., 2006). A number of authors have developed models in which merger waves are motivated by managerial timing of bidders' market overvaluation (see, e.g., Shleifer and Vishny, 2003; Rhodes-Kropf and Viswanathan, 2004), and corporate evidence has generally supported this view (Dong et al., 2006). However, evaluating the overvaluation hypothesis in the context of bank mergers has not yet received researchers' attention.

The merger and acquisition model of Shleifer and Vishny (2003) is based on stock market misvaluations of the combining firms; the model views corporate merger

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[1] See the website of Federal Deposit Insurance Corporation (http //www2.fdic gov/SDI/SOB/)

[2] Consolidated Reports of Condition and Income, Federal Financial Institutions Examination Council, various years.

activities as a response to market mispricing. The key ingredients of the model are the relative valuations of the merging firms and the market's perception of the synergies from the combination. Merger waves could result from managerial timing of market overvaluations of their firms. Managers act on the behalf of existing shareholders and exploit their temporary overvaluation by taking over the undervalued targets. Motivated by the theoretical model of Shleifer and Vishny (2003), Chapter I examines whether U.S. bank mergers are driven by market mispricing.

In contrast to previous literature in the banking merger field, this is the first study to explore whether bank mergers are motivated by equity misvaluation, and more specifically address the following questions: Does misvaluation induce U.S. bank mergers while differentiating the influence of the Q hypothesis? What is the difference between U.S. banks acquiring public banks and private banks? How do geographic and activity diversification influence bank mergers, and how does the market evaluate such diversification activities?

Essay I is organized as follows. Section II discusses related literature and develops the hypotheses. Section III describes the methodology and data. Section IV reports univariate results regarding the misvaluation hypothesis. Section V reports results regarding the wealth effects of geographic and activity diversification. Section VI reports the multivariate results. Section VII discusses the empirical results. Section VIII summarizes the findings and offers conclusions.

2.2 Literature Review

2.2.1 Misvaluation-driven Mergers

The fundamental assumption behind the theory of "stock market–driven acquisitions" is that the market is inefficient, and some firms are thus incorrectly priced. However, the theory also assumes that managers are completely rational, understand stock market inefficiencies, and take advantage of them, in part through merger decisions. The misvaluation hypothesis holds that bidders try to profit either by buying undervalued targets for cash at a price below fundamental value, or by paying equity for targets that, even if overvalued, are less overvalued than the bidder.

From the acquiring firm's perspective, stock-financed mergers can be viewed as two simultaneous transactions, both a merger and equity issue (Andrade et al., 2001). Myers and Majluf (1984) assert that managers with superior information, acting in the best interests of old shareholders, will issue equity when the equity is

overpriced. Moreover, managers will pass up positive net present value investments if the equity necessary to finance them is sufficiently underpriced by the market. Their model illustrates that a firm will invest if and only if the value of its growth opportunity captured by the old shareholders is greater than the value of the assets in place that they must give up. Thus, the decision to issue equity and invest conveys negative information to the market about the value of the firm's assets in place. The model of Myers and Majluf indicates that an equity issue announcement will cause the firm's stock price to decline, but there will be little (no) stock price reaction to the announcement of risky (riskless) debt issues.

According to Shleifer and Vishny (2003), rational managers tend to take advantage of the less rational market. Bidder and target misvaluation should affect expropriation opportunities and managerial incentives, and therefore transaction characteristics including the method of payment (stock versus cash), the form of the offer (merger versus tender offer), bid premium, hostility of the target to the offer, success of the bid, and event-period returns. Stock acquisition occurs when there is a supply of highly overvalued bidders as well as relatively fewer overvalued targets. When industry valuation is high, mergers are more likely to be executed with stock. When industry valuation is low, mergers are more often executed in cash. However, target overvaluation encourages target management to voluntarily accept expropriation offers in order to cash out. Shleifer and Vishny (2003) assume that acquirers are overvalued, and the motive for acquisitions is not to gain synergies, but to preserve some of their temporary overvaluation for long-term shareholders. Specifically by acquiring less-overvalued targets with overvalued stock, acquirers can cushion the fall for their shareholders by leaving them with more hard assets per share. Or if the shareholders perceive the deal as synergistic, then they would overvalue the combined entity. In such a case, the acquirer can still enjoy a long-run cushion effect, while offering a large premium to the target. This model sheds light on who acquires whom, the mode of payment, the valuation consequence of mergers and merger waves.

Rhodes-Kropf and Viswanathan (2004) also construct a model to manifest that periods of stock merger activity are correlated with high market valuations. Their model suggests that valuation impacts mergers and merger waves regardless of the underlying motivation for the mergers. Potential market value deviations from fundamental values on both sides of the transaction can rationally lead to a correlation

between stock merger activity and market valuation; merger waves and waves of cash and stock purchases can be rationally driven by periods of over (under)-valuation of the stock market. Thus, valuation fundamentally impacts mergers; cash acquirers are less overvalued than stock acquirers, and cash targets are undervalued relative to stock targets.

To test the hypothesis that valuation errors affect merger activity, Rhodes-Kropf et al. (2005) decompose the market-to-book ratio (M/B) into three components: the firm-specific pricing deviation from short-run industry pricing; sector-wide, short-run deviations from firms' long-run pricing; and long-run value-to-book. They find strong support for the misvaluation hypothesis of Rhodes-Kropf and Viswanathan (2004) and Shleifer and Vishny (2003), which predicts that valuation errors affect merger activity. Specifically, equity-overvalued acquirers use stock to buy targets with relatively lower firm-specific error; cash targets are undervalued relative to stock targets; cash acquirers are less overvalued than stock acquirers, i.e., misvaluation affects not only who buys whom, but also the method of payment. Rhodes-Kropf and Viswanathan (2005) also find that firms with low long-term market-to-book ratio acquire targets with higher market-to-book ratio, which is counter to the conventional wisdom.

Dong et al. (2006) also test and provide evidence in support of the misvaluation model of mergers and acquisitions from Shleifer and Vishny (2003). Specifically, they examine the misvaluation hypothesis (that inefficient stock market misvaluation is an important driver of the takeover market) and the *Q* hypothesis (that high-quality bidders improve bad targets more than bad bidders improve good targets) using contemporaneous measures of the valuations of bidders and targets, including price-to-book (*P/B*) and the ratio of price-to–residual income valuation (*P/V*). Their evidence is broadly consistent with both hypotheses. The results for the *Q* hypothesis appear to be stronger in the pre-1990 period than in the 1990–2000 period, whereas their analysis indicates that the misvaluation hypothesis gains more support during the 1990–2000 period.

In addition, Ang and Cheng (2006) provide direct empirical evidence that stock overvaluation is an important motive for firms to make stock acquisitions, supporting the market-driven acquisition theory of Shleifer and Vishny (2003). Specifically, Ang and Cheng (2006) find that more overvalued firms are more likely to acquire with stock, and mergers with more overvalued acquirers have a higher

probability of being completed. They assert that an opportunistic acquirer gains only if its overvaluation exceeds the target's overvaluation and the merger premium. Specifically, acquirers are, on average, more overvalued than the targets' premium-adjusted overvaluation, and successful acquirers are more overvalued than unsuccessful ones. Ang and Cheng (2006) establish that overvaluation increases the probability of firms becoming stock acquirers and the probability of stock mergers being completed, after controlling for other factors. Once the overvaluation of the acquirers and the rationality condition are taken into account, the acquiring shareholders are found to be better off than those of similarly overvalued non-acquirers. Overvaluation motivates acquirers try to achieve wealth transfer, instead of wealth creation, through mergers. Wealth transfer from target shareholders to acquiring shareholders or from long-term to short-term shareholders creates no new net wealth to the economy. Instead, this transfer incurs considerable deadweight costs, from investment bank fees to management time, and is socially wasteful.

Motivated by the previous literature, especially the theoretical model of Shleifer and Vishny (2003), we hypothesize that inefficient stock market misvaluation is an important driver of the United States banks' takeover market, with the potential to influence takeover characteristics, such as the means of payment, the likelihood of offer success, and the wealth creation for bidders and targets.

2.2.2 Monitoring Effects: Difference between Taking over Public and Private Banks

According to Grossman and Hart (1980) the proper management of a common property is a public good to all the owners of the property, and there are significant costs in ensuring that directors/managers act in the interest of the owners. If the outsider (uninformed shareholders) can gain only on the shares he already owns (which are few, if any) but must pay all monitoring and takeover costs, the deal may not be worthwhile for him. For the same reason, small shareholders do not have a sufficiently large stake in the firm to absorb the costs of watching the management, and outsiders without a share in a diffusely held firm would never make an effort to improve it. If one shareholder devotes resources to improving management, then all shareholders benefit.

Both Demsetz (1983) and Shleifer and Vishny (1986) assert that blockholders can serve as effective monitors of managerial performance or facilitate takeovers, so

the creation of outside blockholders during mergers can increase firm value. Firms acquiring privately held targets through common stock exchanges tend to create outside blockholders, because such targets are owned by a small group of shareholders. Therefore, acquiring private firms is expected to increase the bidder's firm value.

Jensen (1989) also asserts that diffusely held firms are worth less than ones with concentrated ownership. In a diffusely held corporation, no individual investor finds it worthwhile to engage in monitoring activities, so managers shirk. An investor whose wealth is concentrated in a single venture has strong incentives to monitor the enterprise, limiting managerial malfeasance. A monitor who owns the entire firm enjoys the full product of his efforts to control management. Thus, he selects the intensity of monitoring at which the ex ante expected marginal product of monitoring equals its marginal cost.

Steven (1993) develops a model of a firm operated by a single manager and owned by many shareholders, showing that when monitoring is a public good whose costs are privately incurred, only large shareholders have incentives to monitor managers. The tradeoff of returns from improved monitoring against the cost of bearing idiosyncratic risk would determine a unique optimal ownership structure. Provided the returns of the firm are not too risky and the cost of monitoring is not too high, a concentrated ownership is best. The model predicts that stock price increases with the rise in concentration of stock ownership. Jensen (1989) does not explain why anyone would become a large shareholder while small shareholders earn identical returns and need not monitor. Steven (1993) provides some possible extensions to the analysis. While monitoring the manager, the large shareholder may get information about the value of the firm before other market participants. By trading on this information, the blockholders could earn a return that compensates them for the private cost they incur in obtaining it. The prospective private return could cause the major shareholder to increase his monitoring activities to the benefit of all shareholders. The free rider problem might be redressed by introducing valuable private information as a side product of monitoring. For the minor shareholders, their free riding benefit would be offset by the cost of trading against an information-advantaged party.

Zeckhauser and Pound (1990) employ a sample of 22 industries to investigate the effects of large outside shareholders on corporate performance and corporate

financial policy. That is, they try to determine whether the presence of large shareholders is associated with systematic differences in expected earnings growth, dividend payout ratios, or leverage ratios. They suggest that management has an incentive to tilt earnings toward the present and that outside monitors can ameliorate this distortion. The empirical analysis of Zeckhauser and Pound (1990) indicates symbiosis in the relationship between the monitor and the monitored.

Agrawal and Mandelker (1990) examine the role of large shareholders in monitoring managers when the managers propose antitakeover charter amendments. Controlling for ownership concentration among institutions, managerial ownership, and firm size, Agrawal and Mandelker (1990) find a statistically significant positive relation between institutional ownership and the stockholder wealth effects of various amendments proposals. This supports the "active monitoring hypothesis" proposed by Demsetz (1983) and Shleifer and Vishny (1986), which holds that the existence of large shareholders leads to better monitoring of managers.

Consequently, when bidding banks announce a takeover of private banks using stock, the bidding banks would create large blockholders for themselves. Because ownership is highly concentrated in privately held firms, merged by means of stock exchange, the original owners of the targets become new blockholders of the bidders and would actively monitor the management of the bidding banks. Therefore, compared to acquiring public firms, bidders of private firms are expected to create more wealth for their shareholders when stock is used in acquiring private firms due to the monitoring effects of new blockholders. On the other hand, if the transaction is paid in cash, no new shareholders are created for the bidders regardless of whether the targets are private or public firms and we would thus expect no difference between bidders acquiring public targets and bidders acquiring private targets.

2.2.3 Diversification and Bank Mergers

Economies of scale are the cost advantages that a business obtains due to expansion. They primarily refer to efficiencies associated with supply-side changes, such as increasing or decreasing the scale of its production, of a single product type (Panzar and Willig, 1977). Economies of scope, in contrast to economies of scale, refer to efficiencies primarily associated with demand-side changes, such as increasing or decreasing the scope of the marketing and distribution of different types of products. Economies of scope are one of the main reasons for marketing strategies

such as product bundling, product lining, and family branding (Panzar and Willig, 1981). Economies of scale usually occur when banks takeover banks within the same business sector; economies of scope happen when banks takeover banks operating in different sectors.

During the 1950s and 1960s, many corporations undertook massive diversification programs and diversification activities. This reached a climax during the merger wave of the late 1960s, which marked the rise to prominence of huge conglomerate firms (Berger, 1995). However, recent studies find that economies of scope began to lose its territory since the 1980s. Comment and Jarrell (1995) find a steady trend toward greater focus during the 1980s, and diseconomies of scope in the 1980s are confirmed by a trend towards specialization. In 1988, 55.7% of exchange-listed firms had a single business segment, compared to 38.1% in 1979. Comment and Jarrell (1995) also find a positive relation between stock returns and focus increases; large focused firms were less likely to be subject to hostile takeover attempts than were other firms, but diversified firms in the 1980s are relatively active participants, as both buyers and sellers, in the market for corporate control. Liebeskind and Opler (1996) examine the impact of corporate restructuring on industry concentration, and document a modest increase in median industrial concentration in sample industries between 1981 and 1989.

According to Delong (2001), banking is a special industry and geographic diversification in the U.S. is important because regulation at the state level influences not only the market for corporate control but also activities in which banks may engage. Delong (2001) examines the effects of both geography and activity diversification and asserts that the findings in other industries could not immediately be applied to banking. Compared with Delong (2001), we test the impact of diversification within the banking industry during a longer horizon, and look into mergers when they acquire different types of targets.

2.2.3.1 Benefits of Diversification

Theoretical arguments suggest that diversification has both value-enhancing and value-reducing effects. The potential benefits of operating different lines of business within one firm include greater operating efficiency, less incentive to forego positive net present value projects, greater debt capacity, and lower taxes (Berger and Ofek, 1995).

Chandler's *The Visible Hand* (1977) transcends business history to provide insights on how innovative firms re-draw organizational boundaries and structures for efficient and effective innovation. Chandler argues that because multidivisional firms create a level of management concerned with coordination of specialized divisions, they are inherently more efficient and thus more profitable than if those lines of business were separate. Weston (1970) asserts that resources are allocated more efficiently in internal capital markets than in external capital markets; diversified firms allocate resources more efficiently because they create a larger internal capital market.

Myers (1977) points out that the underinvestment problem arises when stockholders lack incentives to contribute new capital to value-increasing projects where returns are captured mainly by bondholders. By creating a larger internal capital market, diversified firms can reduce this underinvestment problem. The internal capital market argument predicts that diversified companies carry out more positive net present value investments than their segments would make as separate firms.

Stein (1997) examines the role of corporate headquarters in allocating scarce resources to competing projects in an internal capital market. Unlike a bank lender, headquarters has control rights that give it both the authority and the incentive to engage in "winner-picking" by channeling the funds toward "winners" and away from "losers." Management always picks the winners and funnels resources to the projects that pay off more than other projects. Diversified firms have uncorrelated projects from which to choose and thereby create value in more states (economic conditions) of the world than focused firms with highly correlated projects. Houston et al. (1997) state that by doing a good winner-picking job, "headquarters can create value even when its own relationship with the outside capital market is fraught with agency problems and it therefore cannot help at all to relax overall firm-wide credit constraints." Houston et al. show that bank holding companies create internal capital markets in order to lower the cost of capital. According to Houston et al. (1997), the extent to which banking firms face external financing costs when funding new loans greatly influences the banks' capital acquisition process, the effectiveness of monetary policy, and the impact of capital requirements. By examining the cash flow sensitivity of loan growth at bank holding companies and the extent to which bank holding companies establish an internal capital market to allocate capital among their

various subsidiaries, Houston et al. (1997) find that loan growth at subsidiary banks is more sensitive to the holding company's cash flow and capital position than to the bank's own cash flow and capital; bank loan growth is negatively correlated with loan growth among the other subsidiaries in the holding company. Their results suggest that bank holding companies find that the benefits of internal capital markets exceed the additional agency costs involved in coordinating actions within the holding company.

Hubbard and Palia (1999) also conduct empirical tests to assess the value of internal capital markets. The external capital markets were relatively undeveloped during the 1960s, relative to the information-laden decades that followed, and internal capital markets served to overcome inefficient external markets. The greater the information asymmetries between managers and the external market, the more valuable the internal market. All bidders, including those engaged in diversifying mergers, generally earned positive abnormal returns during the 1960s. One possible explanation for bidding firms earning these positive abnormal returns in diversifying acquisitions in the 1960s is that internal capital markets were expected to overcome the information deficiencies of the less-developed capital markets.

Another potential benefit of diversification arises from combining businesses with imperfectly correlated earnings streams (Berger, 1995). Lewellen (1971) asserts that this coinsurance effect gives diversified firms greater debt capacity than single-line businesses of similar size; conglomerates are highly levered relative to their peers. Increased debt capacity could create value by increasing interest tax shields. Diversified firms are predicted to have higher leverage and lower tax payments than if their businesses were operated separately (Berger, 1995). Another tax advantage comes from the tax code's asymmetric treatment of gains and losses. Majd and Myers (1987) note that focused firms are at a significant tax disadvantage; firms pay taxes when they earn profits but cannot get compensated when they lose money. This disadvantage for single-segment firms is reduced, but not eliminated, by the tax code's carryback and carryforward provisions. Majd and Myers (1987) predict that, when one or more segments of a conglomerate experience losses in some years, a conglomerate pays less in taxes than its segments would pay separately.

2.2.3.2 Costs of Diversification

The potential costs of diversification include the use of increased discretionary

resources to undertake value-decreasing investments, cross-subsidies that allow poor segments to drain resources from better-performing segments, and misalignment of incentives between central and divisional managers. There is no clear prediction regarding the overall valuation effect of diversification (Berger and Ofek, 1995).

Diversification can incur several costs. Stulz (1990) argues that diversified firms tend to invest too much (overinvest) in lines of business with poor investment opportunities. Jensen (1986) also asserts that managers of firms with unused borrowing power and large free cash flows are more likely to undertake value-decreasing investments. Diversification programs generally fit within this category. Jensen's argument predicts that diversified firms invest more in negative net present value projects than their segments would if operated independently.

Meyer, Milgrom, and Roberts (1992) argue that a failing business cannot have a value below zero if operated on its own, but can have a negative value if it is part of a conglomerate that provides cross-subsidies. Thus, unprofitable lines of business may create greater value losses in conglomerates than they would as stand-alone firms. Myerson (1982) and Harris, Kriebel, and Raviv (1982) point out that there is information asymmetry costs between central management and divisional managers in decentralized firms, and these costs are higher in conglomerates than in focused firms, for the information is more dispersed within the conglomerate firm. This suggests that diversified firms are less profitable than their lines of business would be separately.

Some authors distinguish between related and unrelated geographic diversification activities, arguing that related geographic diversifying firms perform better than conglomerates. Firms are considered to have conglomerate or unrelated businesses if they are geographically diversified into areas where no physical or knowledge resources are shared, other than financial (Stopford and Dunning, 1983; Wrigley, 1970; Rumelt, 1974). Rumelt (1974) argues that compared to unrelated diversification, related diversification affects value more positively, since skills and resources can be used in related markets. The effects of reputation and economies of scope arise when the joint cost of producing two or more outputs is less than the sum of the costs of producing each output individually (Berger and Ofek, 1995). Benefits from a positive reputation in an existing business and from economies of scope are available from related, but not from unrelated diversification (Nayyar, 1993).

2.2.3.3 Diversification and Bank Mergers and Acquisitions

Morck, Shleifer, and Vishny (1990) use a sample of 326 U.S. acquisitions

between 1975 and 1987 and find that bidders experience lower and predominantly negative announcement-period returns when they diversify. They suggest that managerial objectives may drive acquisitions that reduce bidding firms' values but increase managerial personal benefits. However, Morck et al. (1990) do not examine returns to targets. Another interpretation of their results implies a value transfer from bidder to target shareholders in diversifying mergers, but not necessarily economic value destruction in such mergers (Delong, 2001). The study of Morck et al. (1990) therefore does not answer the question of whether diversifying mergers are economically undesirable. Houston and Ryngaert (1994) provide a partial answer regarding geographic diversification. With regards to corporate control, Cornett et al. (1998) find that corporate governance mechanisms that reduce the manager–shareholder conflict are not as effective in diversifying (interstate or activity) acquisitions as they are in focusing (interstate or activity) acquisitions. These diversified acquisitions are therefore less likely to be value maximizing, and shareholders and bank regulatory agencies should therefore be more wary of interstate or activity-diversifying acquisitions.

On the other hand, intrastate bank mergers, which are subjected to few or no restrictions, do not destroy bidder value (Delong, 2001). Palia (1993) examine state regulation of acquirer and target banks in a geographically dispersed population, allowing the effects of a varied state regulatory menu to be assessed. This study finds merger premiums to be related to the characteristics of both acquirer and target banks, as well as the regulatory environments in both acquirer and target bank states. States with restricted branching make the targets more appealing, and therefore increase the premium, while states that allow multibank holding companies increase the number of bidders and also increase the premium. Location of a bank influences not only the market for corporate control, but also the characteristics of a bank's assets. A bank's loan portfolio is greatly influenced by local regulations, as some states allow their banks to engage in underwriting securities and insurance while other states ban such activities. Different regulatory environments therefore influence business decisions. With unregulated firms, business decisions are based on profit maximization.

Moreover, focusing on the banking industry provides a control for industry-specific factors. If any inter-industry effects exist, studying intra-industry mergers minimizes this impact. Dealing with different industries at the same time may result from some industries' tendency to engage in a value-maximizing type of merger,

while other industries engage in a non-value-maximizing type of merger. In our study, we focus on United States banking industry. And we hypothesize that the market can distinguish activity focus from activity diversification, as well as geographic focus from geographic diversification, and may react differently when a merger is focused both in terms of activity and geography.

Overall, the previous literature, reviewed in Section II, provides the basis for how to extend our understanding of banking merger behaviors. In the following sections, we conduct an in-depth empirical study from these three viewpoints, with an emphasis on the misvaluation hypothesis.

2.3 Methodology and Data

2.3.1 Measures of Overvaluation

To address the question whether bank mergers are motivated by stock market mispricing, it requires an appropriate misvaluation measure. However, there is no consensus in the empirical research as to how the misvaluation of a stock should be measured (Ang and Cheng, 2006). Dong et al. (2006) employ two empirical proxies in their study: the price-to-book ratio of equity (hereafter *P/B*) and the price-to–residual income value derived from the model of Ohlson (1995) (hereafter *P/V*). Although *B* and *V* are both proxies for fundamental value, residual income value (*V*) contains forward-looking information, namely, analysts' forecasts of future earnings. *P/V* filters out the extraneous information about growth and managerial agency problems much better than *P/B* (Dong et al., 2006). *P/V* tends to be a relatively focused measure of misvaluation, and is used by several authors for this purpose, including Frankel and Lee (1998), Lee, Myers, and Swaminathan (1999), Ali, Hwang, and Trombley (2003), D'Mello and Shroff (2000), and Doukas, Kim and Pantzalis (2010).

To avoid the controversy associated with the P/B ratio as a misvaluation measure (Rhodes-Kropf, Robinson, and Viswanathan (2005)), we use *P/V* as the only measurement of misvaluation. We use *P/B* value 2 years before a merger to capture the growth prospects of merging banks. The use of *P/B* value near the acquisition announcement is more likely to reflect the market's misvaluation.[3]

2.3.1.1 P/V Based on the Three-period Forecast Horizon Residual Income Model

According to Dong et al. (2006) and Ohlson (1995), the intrinsic value of a

[3] When we use the P/B value one year before the merger, we get similar results.

stock includes two parts: the book value of equity and the present value of its forecasted excess income. Excess income is based on analysts' forecasts of future earnings prospects. For each stock in month *t*, its intrinsic value is expressed as:

$$V(t) = B(t) + \sum_{i=1}^{\infty} \frac{E_t[\{ROE(t+i) - r_e(t)\}B(t+i-1)]}{[1+r_e(t)]^i}$$

where E_t is the expectations operator, B(t) is the book value at time *t* (only positive B(t) observations are kept), *ROE(t+i)* is the return on equity for period *t+i*, and $r_e(t)$ is the firm's annualized cost of equity capital. For practical purposes, we follow Dong et al. (2006) and Lee et al. (1999) and adopt a three-period forecast horizon:

$$V(t) = B(t) + \frac{[f^{ROE}(t+1) - r_e(t)]B(t)}{1+r_e(t)} + \frac{[f^{ROE}(t+2) - r_e(t)]B(t+1)}{[1+r_e(t)]^2} + \frac{[f^{ROE}(t+3) - r_e(t)]B(t+2)}{[1+r_e(t)]^2 r_e(t)}$$

where $f^{ROE}(t+i)$ is the forecasted return on equity for period *t+i*, the length of a period is 1 year, and the last term discounts the period *t+3* residual income as a perpetuity.

Forecasted *ROEs* are calculated as:

$$f^{ROE}(t+i) = \frac{f^{EPS}(t+i)}{\bar{B}(t+i-1)}$$

where

$$\bar{B}(t+i-1) \equiv \frac{B(t+i-1) + B(t+i-2)}{2}$$

and $f^{EPS}(t+i)$ is the forecasted earnings per share (*EPS*) for period *t+i* obtained from I/B/E/S. Future book value of equity is computed as:

$$B(t+i) = B(t+i-1) + (1-k)f^{EPS}(t+i)$$

where k is the dividend payout ratio $k = \frac{D(t)}{EPS(t)}$. Following Lee et al. (1999), we delete observations where $k > 1$.

The annualized cost of equity, $r_e(t)$, is determined as a firm-specific rate using the capital asset pricing model (CAPM), where the time-*t* beta is estimated using the trailing 3 years of monthly return data.

2.3.1.2 P/V Based on the Perpetual Residual Income Model

Similar to the residual income model of Dong et al. (2006) and Ohlson (1995),

another measurement of intrinsic value is constructed, which does not rely on analysts' forecasts of future earnings prospects. This is mainly motivated by two reasons. First, it permits the estimation of intrinsic values for a considerably larger sample of banks. Second, it can be used as a robustness check in testing the overvaluation hypothesis. The actual EPS(t) is used as the perpetual income of the firm, and the retained earnings $\mathrm{EPS(t)} * (1 - \mathrm{k})$ is treated as the excess income of the firm. The intrinsic value is expressed as:

$$\mathrm{V} = \mathrm{B(t)} + \frac{\mathrm{EPS(1-k)}}{r_e(t)},$$

where k is the dividend payout ratio $k = \frac{D(t)}{EPS(t)}$. Following Lee et al. (1999), we delete observations where $k > 1$. $(r_e(t))$ is the annualized cost of equity, determined as a firm-specific rate using the CAPM, where the time-t beta is estimated using the trailing 3 years of monthly return data.

To verify the robustness of our main findings, we also use the alternative constant discount rate of 12.5% (following Dong et al. (2006) and D'Mello and Shroff (2000)) for both measures. Both *P/B (2 years before)* and *P/V* ratios are winsorized at the 1% and 99% tails. Higher (lower) values of *P/B (2 years before)* indicate higher (lower) growth prospects while higher (lower) *P/V* values represent relative overvaluation (undervaluation). Previous studies have reported that the predictive ability of *P/V* is robust to the cost of capital used in the model (Lee et al., 1999; Dong et al., 2006) and to whether the discount rate is allowed to vary across firms (D'Mello and Shroff, 2000).

2.3.2 Announcement-period Returns Using Event Study

Event study is a statistical method used to assess the impact of public announcements of new value-relevant information. The basic idea is to find the abnormal return that can be attributed to the event being studied, based on the return that stems from the price fluctuation of the market as a whole (Gilson and Black, 1995). According to MacKinlay (1997), event study is a "valuable and widely used tool in economics and finance" (p. 38), and has been used in a wide variety of studies, including mergers and acquisitions, earnings announcements, debt or equity issues, corporate reorganizations, investment decisions, and corporate social responsibility (MacKinlay, 1997; McWilliams and Siegel, 1997).

Abnormal return is obtained by subtracting the normal or expected return in

the absence of the event, $AR_{it} = R_{it} - E(R_{it})$, from the actual return in the event period. There are several ways to measure the expected return, $E(R_{it})$. The frequently used benchmarks for expected returns include the returns predicted by the market model, market returns, and firm-specific average returns from the past period. Among these, the market model is likely the most frequently used approach (Kallunki et al., 2002). The market model is implemented in the present study, and is expressed as follows:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}, \quad \text{where } t = -274, \ldots, -20$$

The Center for Research in Security Prices (CRSP) equal-weighted return is used as the market return, and the market model parameters are estimated over the 255-day period from event day -274 to event day -20. R_{it} is the rate of stock return for firm i on day t, R_{mt} is the market index rate of return on day t, and ε_{it} is an error term. Thus, the abnormal returns are calculated from actual returns during the event period and the estimated coefficients from the estimated period:

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt}, \quad \text{where } t = -10, \ldots, +10$$

Cumulative abnormal returns (*CAR*) are also calculated during different event windows, encompassed by event days (*-n, +n*), where event day 0 is the acquisition announcement date.

We also estimate long-term abnormal returns based on the Fama and French 3-factor model with an estimation period of 5 years:

$$R_{jt} = \alpha + \beta_j R_{mt} + s_j SMB_t + h_j HML_t + \varepsilon_{jt}$$

The monthly abnormal return for the common stock of the j^{th} firm on month t is given by:

$$AR_{jt} = R_{jt} - (\widehat{\alpha_j} + \widehat{\beta_j} R_{mt} + \widehat{s_j} SMB_t + \widehat{h_j} HML_t)$$

The cumulative average abnormal returns (CAAR) are analogous to those defined in the market model.

2.3.3 Data

The sample data on U.S. bank takeover bids are obtained from Thomson ONE Banker Database between 1985 and 2006. The sample period ends at the end of 2006 in order to assess the performance of bidders 2 years after the merger announcements. The sample originally included 2,148 complete deals, of which the bidding firms'

stocks are traded on the NYSE, AMEX, or NASDAQ, with CRSP data available around the announcement. Each offer is announced between January 1, 1985 and December 31, 2006. Panel A of Table 2.1 reports the annual breakdown of the sample by method of payment, type of target bank, geographic diversification (cross-state). It also reports the nominal and inflation-adjusted average deal value (2005 as the base year) and the market value of bidders and market value of targets by calendar year. Panel B of Table 2.1 classifies the mergers by method of payment, type of target bank, geographic diversification (cross-state), and activity diversification and reports the median deal size of each type.

Panel A shows that the number of bank merger transactions peaks in the 1990s, with 67% of the transactions taking place during 1993–2000. Merger activity is somewhat subdued in the early 1980s and early 2000s. The average transaction value also peaks in late 1990s. The average market value of target banks is about five times smaller than the average market value of bidders. About half of the bank mergers, as shown in Panel B, are paid with stock, more than half of the mergers aim at public targets, and one-third of the mergers cross state boarders. Among all the U.S. bank mergers, more than half are characterized as geographic and activity focused, 1286 deals.

2.4 Misvaluation Hypothesis: Univariate Results

This section reports univariate results on the relation between the two valuation measures and takeover characteristics. Accounting data for calculating book value, payout ratio and earning per share are taken from Compustat. Earnings forecasts for calculating the residual income intrinsic values are obtained from I/B/E/S. To maintain sample size, we do not exclude a transaction from the overall sample if accounting or I/B/E/S data items are missing.

2.4.1 General Empirical Results

As discussed earlier, the misvaluation hypothesis predicts that rational managers understand stock market inefficiencies, and take advantage of them by merger activities. The models of Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004) predict that overvalued firms use stock to buy relatively undervalued target firms; cash targets are more undervalued than stock targets; cash acquirers are less overvalued than stock acquirers.

Table 2.2 reports how the two valuation measures are related to the type of target (public vs. private) and method of payment used. The evidence reported in Table 2.2 appears to be consistent with the prediction of the misvaluation hypothesis. Panel A reports mean values of *P/B (2 years before)* and *P/V* calculated using the three-period forecast horizon residual income model, and their differences between acquirer and target banks, and across method of payment. Panel B reports the results based on *P/B (2 years before)* and *P/V* values calculated using the perpetual residual income model.

From the entire sample (All), the mean values of *P/B (2 years before)* and *P/V* ratios, in Panel A of Table 2.2, indicate that acquiring banks have higher relative valuation ratios than their public targets. Specifically, the average *P/B (2 years before)*, *P/V (k=12.5%)* and *P/V* ratios for acquirers are 3.55, 5.56 and 6.23, and 2.42, 3.64 and 6.17 for target banks, respectively. For the 198 transactions for which we are able to calculate the misvaluation measures, the acquirer–target *P/V (k=12.5%)* and *P/V* ratio differences are 1.92 and 0.06, respectively, statistically significant when the cost of equity is estimated using the constant discount rate of 12.5% (column (1) - (2)). Hence, the evidence, based on the entire sample, suggests that overvalued banks tend to acquire public banks that are less overvalued than they are. In addition, bidders with higher growth prospects tend to acquire targets with lower growth prospects. Interestingly, bidders purchasing private targets are more overvalued than their peers acquiring public targets. The average *P/V (k=12.5%)* and *P/V* ratios for acquirers of public targets are 5.56 and 6.23, whereas the corresponding relative valuation ratios for acquirers of private banks are 7.54 and 9.68, respectively. The growth prospects of bidders buying public versus private banks, as revealed by the *P/B (2 years before)* ratio, do not seem to be dramatically different.

Bidder valuations tend to exceed public target valuations significantly in equity offers but not in cash offers. For the 137 cash transactions for which *P/V* can be calculated, the bidder–target *P/V (k=12.5%)* and *P/V* differentials are 1.34, and -1.1, respectively[4] (only marginally significant for *P/V* where k=12.5%). Among the 61 stock offers with data available, the bidder–target *P/B (2 years before), P/V (k=12.5%)* and *P/V* differential is 2.55, 2.31 and 3.19, respectively (all three measures

[4] The big sample size reduction caused by IBES database availability is likely to influence the consistent of empirical result. So, we also use the constructed perpetual model to estimate the intrinsic values (see Panel B of Table II) and provide better result.

are highly significant). For stock payment deals, the *P/B (2 years before)*, *P/V (k=12.5%)* and *P/V* differentials between bidders acquiring public targets and private targets are 0.15, -1.67, and −2.26, respectively (both *P/V* measures are highly significant). As shown earlier for the full sample, the bidders who are acquiring private targets with stock or cash are consistently more overvalued than their peer banks acquiring public targets.

Consistent with the overvaluation hypothesis, which postulates that cash acquirers are less overvalued than stock acquires, the results show that equity offers are associated with higher bidder valuations than cash offers, and the bidder–target difference in valuation is, on average, greater among equity offers than cash offers. Columns (5) and (6) show that for all three relative valuation measures, bidders using stock payment to acquire public targets have significantly higher growth prospect/valuation than bidders using cash payment, with *P/B (2 years before)*, *P/V (k=12.5%)* and *P/V* differentials of 1.75, 1.04 and 2.3. Similarly, column (7) shows that for all three relative valuation measures, the bidders offering equity to acquire private targets also have higher growth prospect/valuation than bidders offering cash, with *P/B (2 years before)*, *P/V (k=12.5%)* and *P/V* differentials of 3.55, 1.18 and 1.06. These results are consistent with the misvaluation hypothesis, which predicts that highly overvalued bidders are more likely to use stock payment. Comparing bidder valuations for the entire sample, the evidence in column (8) indicates that bidders offering cash have significantly lower growth prospects than their bidder peers offering stock; the *P/B (2 years before)* ratio is 4.56 for stock offers and 2.26 for cash offers, with a mean difference of 2.3 (statistically significant at the 1% level). Similarly, *P/V (k=12.5%)* is 5.71 for cash versus 7.31 for stock, and *P/V* is 6.54 for cash versus 9.21 for stock (both differences are statistically significant). This suggests that stock acquirers are overvalued firms, confirming the prediction of the overvaluation hypothesis, which postulates that overvalued bidders are more likely to use overvalued equity than cash in acquiring targets. Furthermore, for all three relative valuation measures, the mean valuation difference between bidders and targets is significantly larger in equity offers than cash offers ($p < 0.01$; tests not reported, but available upon request).

We replicate the previous analysis using our second relative valuation measure: a P/V ratio based on the perpetual residual income model. The results for this considerably larger sample are reported in Panel B of Table 2.2, and are consistent

with those reported thus far.

Overall, regardless of which relative valuation measured is used, the evidence is consistent with the prediction of the overvaluation hypothesis that overvalued bidders use stock to buy relatively undervalued targets.

2.4.2 Effects of Target Valuations

In this section, we examine the link between pre-offer valuation measures of targets and bidders to the characteristics of the takeover. Panels A and B of Table 2.3 report the relation between target valuations and takeover characteristics. The results in Panel B1 are based on the estimation of the P/V ratio (intrinsic value) using the three-period forecast horizon residual model. Panel B2 contains results based on the estimation of the P/V ratio using the perpetual residual model. Panels C and D describe the relation between acquirer valuations and takeover characteristics. As before, Panel D1 reports results based on the estimation of the *P/V* ratio using the three-period forecast horizon residual model. Panel D2 provides evidence results based on the estimation of the *P/V* ratio using the perpetual residual model. For all deals with data available, bidders and targets in each month are ranked based on their respective valuation ratios and quintile groups are formed. The monthly sorting process ensures that any effects we detect are cross-sectional, and thus not influenced by time-series fluctuations in valuation and takeover characteristics. Quintile 5, the top valuation quintile, has the highest bidder and target *P/B (2 years before)* and *P/V*; quintile 1 represents the lowest valuation ratios. We also report differences across the top and bottom valuation quintiles (5 – 1) to illustrate whether higher market valuations are related to transaction characteristics.

Due to the effects of severe sample size reduction, caused by IBES database availability in estimating intrinsic value based on the three-period forecast horizon residual income model, the results reported in Panels B1 and D2 are not offered to make meaningful inferences. Therefore, we will focus on discussing the empirical results reported in Panels B2 and D2 that rely on intrinsic value (V) estimates obtained from the perpetual residual income model.

As shown in Panel A, targets with higher growth prospects, measured by *P/B (2 years before)* ratio, are more likely to be associated with stock offers. Specifically, the mean difference in the probability of using stock between high and low growth targets is 18.34%. Interestingly, high growth targets realize a much smaller bid

premium than their peers with low growth prospects with a mean 5-1 quintile difference of -48.46% (statistically significant at the 1% level). Since overvalued bidders use stock, this finding provides additional support for the view that bidders using stock are not buying targets with growth prospects. Furthermore, targets with low growth prospects appear to realize higher abnormal returns than high growth targets. The quintile difference for target announcement-period returns is -5.63% (significant at the 5% level for *P/B (2 years before)*). The results in Panel B2 demonstrate that overvalued targets are consummated with stock offers. The 5-1 quintile difference in the probability of using stock is 13.24% (highly statistically significant). As before, bidders pay a considerably larger premium for undervalued targets and the later realize larger cumulative announcement-period abnormal returns. The quintile difference for the bid premium is -12.92% (significant at the 1% level for *P/V*) and for the target announcement-period returns is -6.39% (significant at the 1% for *P/V*), respectively. This is consistent with the finding of Walkling and Edmister (1985) that relatively lower-valued firms command significantly higher bid premiums. In general, these results provide supplemental support for the overvaluation hypothesis.

2.4.3 Effects of Bidder Valuations

The relation between bidder valuations and takeover characteristics are described in Panels C and D of Table 2.3. First, these results indicate that higher bidder valuations are associated with greater use of equity and less use of cash as a means of payment. The differences in the probability of using stock between the top and bottom bidder valuation quintiles are 74.77% (*P/B (2 years before)*) and 46.69% (*P/V*) (both significant at the 1% level).

Second, higher bidder valuation is associated with higher bid premium. Using the *P/B (2 years before)* measure in Panel C, the 5-1 quintile difference in premium is 26.61% for the entire sample (significant at the 1% level). Using the *P/V* measure in Panel D2, the quintile difference in premium is 11.76% for the entire sample (significant at the 1% level). Hence, the evidence suggests that acquirers with high valuations pay higher bid premiums.

Third, a higher prospect for bidder growth is associated with higher target stock returns. Specifically, in Panel C, the *P/B (2 years before)* quintile difference in target announcement-period stock returns is 10.18% for the entire sample (significant

at the 1% level). However, prior studies (i.e., Lang et al. (1989) and Servaes (1991)), indicate that (depending on subsequent offer success), there is no significant relation between bidder *Q* and target announcement return. In Panel D1, higher *P/V* is also associated with higher target announcement-period returns. The difference between the top and bottom target valuation quintiles is 4.80% (significant at the 1% level).

Fourth, higher bidder valuation is associated with lower bidder announcement-period returns. The mean acquirer announcement-period returns are significantly lower when the acquirer has a high valuation, based on either *P/B (2 years before)* or *P/V*. The mean quintile differences in bidder abnormal returns around offer announcements are -1.71% (sorted by *P/B (2 years before)*) and -1.65% (sorted by *P/V* in Panel D1), both significant at the 1% level. A similar pattern emerges in Panel D2 for a larger sample of bidders.

Moreover, the evidence in Panels C and D of Table 2.3 indicates that overvalued bidders are less (more) likely to successfully merge with public (private) targets. The quintile difference in the probability of merging with public targets is -42.53% (*P/V*) (significant at the 1% level). This difference results primarily from equity offers (see Table 2.2), where the valuation of bidders (for all three measures) targeting public banks (column (1)) is significantly lower than the valuation of bidders targeting private targets (column (3)). Hence, bidding banks with higher valuations are more likely to engage in acquisitions of private banks than public banks.

2.4.4. Short-term Announcement Returns

In this section we focus on the market's reaction to bank merger announcements. Table 2.4 reports announcement returns for private and public targets executed with different methods of payment. Panels A1 and A2 of Table 2.4 show the wealth effects for deals settled with stock payment while Panels B1 and B2 show the wealth effects for deals completed with cash payment.

First, merger announcements for deals with equity payment cause the bidders' stock price to decline when they merge with public targets, but there is no negative impact on the bidders' stock price when they merge with private targets. For equity deals, the average abnormal return (AAR) on the announcement day (t=0) for bidders is -1.36% when they acquire public targets (significantly negative at the 1% level).[5]

[5]Among the 492 announcements, not reported but available upon request, 335 are negative suggesting that this

Column (3) in Panel A1 shows that the bidders' AAR on the announcement day is 0.06% when they acquire private targets with stock (not significantly different from zero). The difference between the AAR of bidders acquiring public targets versus private targets (column (1) - (3) in Panel A1) is -1.42% (significantly negative at the 1% level). Panel A2 shows a similar pattern for the 3- and 5-day window intervals. These results appear to support the monitoring hypothesis, which predicts that acquirers of private banks using stock benefit from the concentrated ownership of targets because private targets are owned by a small group of shareholders who are expected to exert monitoring on bidders (Demsetz (1983); Shleifer and Vishny (1986)).

Second, merger announcements for deals with equity payment cause the target's stock price to increase; the abnormal return of the targets is higher than that of the bidders in these deals. For deals with equity payment, the AAR on the announcement day for public targets is 9.13% (significantly positive at the 1% level); in unreported results, 362 of 492 announcements are positive. On the announcement day, the difference between the AAR of the bidders and the targets (column (1) - (2) in Panel A1) is -10.49% (significantly negative at the 1% level), indicating that the market recognizes the potential monitoring power of targets. Panels A2 provides similar evidence for the 3- and 5-day window intervals.

Third, merger announcements for cash deals cause bidders' stock price to increase when they acquire public targets, but there is no significant influence on the bidders' stock price when they acquire private targets. As reported in Panel B1 (see column (1)), the AAR on the announcement day for bidders is 1.04% when they acquire public targets (significantly positive at the 1% level); among the 877 announcements, 537 are positive. Column (3) shows that the AAR on the announcement day for the bidders is 0.22% when they acquire private targets (not significantly different from zero). The difference between the AAR of bidders for public targets and private targets (column (1) - (3) in Panel B1) is 0.82% (significantly positive at the 1% level). These patterns hold for the 3- and 5-day window intervals (see Panel B2).

Moreover, merger announcements for deals with cash payment cause the target's stock price to increase; the stock return of the targets is higher than that of the bidders. As shown in column (2) of Panel A, for deals executed using cash payment,

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result is not driven by outliers.

the AAR on the announcement day for public targets is 2.82% (significantly positive at the 1% level); among the 877 announcements, 584 are positive. On the announcement day, the difference between the AAR of the bidders and the targets (column (1) - (2) in Panel B1) is -1.78% (significantly negative at the 1% level). We observe similar results for the 3- and 5-day window intervals (see Panel B2). For example, the difference between the CAARs of bidders buying public versus private targets over the (-1,+1) and (-2,+2) interval period (column (1) - (3)) are 1.38% and 1.66% (both significantly positive at the 1% level).

Overall, the evidence from Table 2.4 suggests that stock bidders experience negative abnormal returns when they acquire public targets, but do not realize losses when they purchase private targets. Compared with cash bidders of public targets, cash bidders of private targets do not realize higher returns, suggesting that, in the absence of additional monitoring, illiquidity plays a role in affecting the bidder's shareholder value.

2.4.5 Post-acquisition Performance

Because stock is more likely to be utilized as the method of payment in mergers when the bidders' valuations are high (Shleifer and Vishny (2003)) and merged banks will eventually face price corrections from their elevated levels (Rau and Vermaelen (1998); Loughran and Vijh (1997); Ang and Cheng (2003)), it is expected that bidders will experience negative long-run returns in stock acquisitions, and positive returns in cash acquisitions.

Table 2.5 reports the long-term post-acquisition performance of the bidders, measured by long-term CAAR using the market model and Fama and French (1993) 3-factor model. Panels A1 and A2 of Table 2.5 report the long-term performance of bidders associated with stock acquisitions. The results based on the market model appear in Panel A1. The 2-year CAAR for bidders acquiring public targets with stock is -0.50%, and the 2-year CAAR for bidders buying private targets is -6.96%. The results based on the Fama and French 3-factor model appear in Panel A2. The 2-year CAAR for bidders purchasing public targets with stock is -1.83%, and the 2-year CAAR for bidders buying private targets with stock is -6.37% (both significantly negative). Jointly, acquisitions of private banks appear to destroy more bidder shareholder value than acquisitions of public banks. Taking into account that bidders'

performance 1 year prior to such acquisitions was positive and statistically significant indicates that the value loss to shareholders of acquiring banks is substantial.

Panel B1 and B2 report the long-term performance of bidders executing a merger with cash payment. The results based on the market model, shown in Panel B1, indicate that the 2-year CAAR for bidders buying public targets with cash is 0.80%, and the 2-year CAAR for bidders acquiring private targets with cash is 2.76%. The results based on the Fama and French 3-factor model, shown in Panel B2, indicate that the 2-year CAAR for bidders purchasing public targets with cash is 2.98%, and the 2-year CAAR for bidders buying private targets with cash is 3.40% (both significantly positive).

Overall, consistent with the predictions of the Shleifer and Vishny (2003) overvaluation model, the long-term post-acquisition performance of stock bidders is significantly negative, but significantly positive for cash bidders.

2.5 Diversification: Univariate Test

This section reports empirical results from examining the wealth effects of bank diversification arising from bank mergers. We consider two types of bank diversification transactions: geographic diversification and activity diversification. When the bidding bank targets a bank in another state, it is defined as a geographic diversification deal; otherwise, it is considered a geographic focus deal. We classify the activity diversification according to four-digit SIC codes. If the first three digits of the bidder's SIC code is the same as the target's SIC code, it is defined as a focus deal; otherwise, it is considered as a diversification deal.

2.5.1 Effects of Geographic Diversification

The wealth effects of geographic diversification in response to bank merger announcements are shown in Table 2.6. The market reaction around the merger announcements is measured by CAAR(-1, +1).

First, geographically focusing deals, in which both bidder and target are within the same state, create more wealth for bidders than geographically diversifying deals; geographically diversifying deals, in which bidder and target are from different states, create more wealth for targets than geographically focusing deals. The combined wealth effect of geographically focusing deals is lower than that of geographically diversifying deals. For the entire sample of 2,148 deals, as shown in Panel A of Table

2.6, the 3-day CAAR around the announcement day for the bidders is 0.81% when they acquire targets in the same state, and -0.82% when they acquire targets in a different state. The difference is 1.63% and significant at the 1% level. The CAAR (-1, +1) around the announcement day for the targets is 6.29% in geographically focusing deals, and 15.00% in geographically diversifying deals. The difference is -8.71% and statistically significant at the 1% level. Moreover, geographically focusing deals create 7.32% wealth around the 3-day announcement period for the merger partners. Geographically diversifying deals create 13.00% wealth for the merger partners. This represents a difference of -5.68% (significantly negative at the 1% level), suggesting that geographic diversification is more rewarding.

Second, for the deals where bidders target public banks, Panel B of Table 2.6, geographically focusing deals, in which bidders and targets operate in the same state, create more wealth for the bidders. Geographically diversifying deals, in which bidder and target are in different states, create more wealth for the targets. The combined return of geographically focusing deals is lower than that of geographically diversifying deals. For the 1,369 deals targeting public banks, the 3-day CAAR of the bidders is 1.01% when they acquire targets in the same state, whereas -1.69% when they acquire targets in a different state. The difference is 2.70% (significantly positive at the 1% level). The CAAR(-1, +1) around the announcement day for the targets is 6.15% in geographically focusing deals, and 15.02% in geographically diversifying deals. This represents a difference of -8.87% (significantly negative at the 1% level). The geographically focusing deals create 7.20% wealth around the announcement for the merger partners, and geographically diversifying deals create 13.27% wealth for the merger partners. This represents a difference of -6.07% (significantly negative at the 1% level).

Third, for banks targeting private ones, Panel C of Table 2.6, geographically focusing deals, in which bidder and target are within the same state, tend to create more wealth for the bidders. For the 779 banks targeting private banks, Panel C of Table 2.6, the CAAR(-1, +1) around the announcement day for bidders is 0.33% when they acquire targets in the same state, and -0.01% when they acquire targets in a different state.

Finally, geographically focusing deals create more wealth for the bidders when they acquire public than private banks (see Panel C of Table 2.6). However, geographically diversifying deals create less wealth for the bidders when they acquire

public than private banks. For the 1,485 geographically focusing deals, the bidders for the 1,051 deals that target public banks realize a CAAR(-1,+1) of 1.01%, significantly higher than the CAAR of bidders targeting private banks. The difference is 0.68% and significant at the 1% level. Among the 663 geographically diversifying deals, the bidders in the 318 deals that target public banks have a CAAR(-1,+1) of -1.69%, significantly lower than the CAAR of bidders targeting private banks. The difference is -1.68% and significant at the 1% level.

Overall, the evidence demonstrates that acquiring banks realize greater abnormal returns when they expand their operations within the same state rather than when they acquire public or private targets in a different state. Targets reap positive abnormal returns in mergers with bidders from the same state and from different states, with higher returns in geographically diversified mergers, suggesting that bidders tend to overpay targets located outside their geographical domain.

2.5.2 Effects of Activity (Business) Diversification

Now we turn to activity (business) diversification. The effects of activity diversification on the wealth effects of the merger announcements are reported in Table 2.7.

First, for the entire sample, as shown in Panel A of Table 2.7, activity-focusing deals, in which the bidder and target have the same first three digits in their SIC codes, create more wealth for the bidders. However, activity-diversifying deals, in which the bidder and target do not share the same first three digits of their SIC codes, create more wealth for the targets. The combined wealth effect of activity-focusing deals is lower than that of geographically diversifying deals. For the entire sample of 2,148 deals, the CAAR (-1, +1) around the announcement day for the bidders is 0.48% for activity-focusing deals, and -0.59% for activity-diversifying deals. The difference is 1.07% (significant at the 1% level). The CAAR (-1, +1) around the announcement day for the targets is 6.83% in activity-focusing deals, and 16.17% in activity-diversifying deals. The difference is -9.34% (significantly negative at the 1% level). Activity-focusing deals (column (1)) create wealth of 7.53% around the announcement for the merging partners. Activity-diversifying deals create wealth of 15.07% for the merging partners. This represents a difference of -7.54% (significantly negative at the 1% level).

Second, for deals targeting public firms, Panel B of Table 2.7,

activity-focusing deals create more wealth for the bidders while activity-diversifying deals create more wealth for the targets. The combined return of activity-focusing deals is lower than that of activity-diversifying deals. For the 1,369 deals targeting public banks, the CAAR(-1, +1) around the announcement day for the bidders is 0.67% when they acquire targets involved in similar business and -1.13% when they acquire targets involved in different business. The difference is 1.80% and significant at the 1% level. The CAAR(-1, +1) around the announcement day for targets is 6.70% in activity-focusing deals, and 16.08% in activity-diversifying deals. This represents a difference of -9.38% and significant at the 1% level. Activity-focusing deals create 7.40% wealth around the announcement for both parties while activity-diversifying deals create 8.56% wealth, with a difference of -7.59% and significant at the 1% level.

Finally, we turn our focus on the wealth effects associated with public and private targets. As shown in Panel C of Table 2.7, activity-focusing deals create more wealth for the bidders when they acquire public banks than when they acquire private banks. Activity-diversifying deals create less wealth for the bidders when they acquire public banks than when they acquire private banks. For the 1,806 activity-focusing deals, the bidders in the 1,150 deals targeting public banks have a CAAR(-1, +1) of 0.67%, significantly higher than the CAAR(-1, +1) of bidders targeting 656 private banks, 0.14%. Among the 342 activity-diversifying deals, the bidders of the 219 deals targeting public banks have a CAAR(-1, +1) of -1.13%, significantly lower than the CAAR(-1, +1) of bidders targeting private banks, 0.37%.

2.5.3 Combination Effects of Geographic and Activity Diversification

The joint wealth effects of geographic and activity diversification around merger announcements are shown in Table 2.8. Following Delong (2001), the entire sample is divided into four mutually exclusive categories: mergers with geographic and activity focus, mergers with geographic focus and activity diversification, mergers with geographic diversification and activity, and mergers that are associated with geographic and activity diversification.

Deals involving both activity and geographic focus create more wealth for the shareholders of bidders than the other three groups: geographically focusing and activity-diversifying deals, geographically diversifying and activity-focusing deals, and geographically and activity-diversifying deals. Deals involving both activity and geographic focus create less wealth for the targets than the other three groups,

whereas deals involving both activity and geographic diversification create the most wealth for the targets. For the entire sample of 2,148 deals (column (5) of Panel A of Table 2.8), the CAAR(-1, +1) of the bidders is 1.01% for the activity and geographic focus group, but negative for each of the other three groups (significant differences shown in column (5) of Panel B). The CAAR(-1, +1) of the targets is 5.14% for the activity and geographic focus group, much smaller than that of the other three groups (shown in column (8) of Panel A of Table 2.8).

Deals associated with diversification create more wealth for the merged banks, but most of the created wealth goes to targets. The CAAR(-1, +1) for the activity and geographic diversification group is 6.45%, significantly smaller than that of the other three groups: 15.93% for the geographic and activity diversification group, 12.24% for the geographic focus and activity diversification group, and 14.37% for the geographic diversification and activity focus group (shown in column (2) of Panel A of Table 2.8). The targets capture the bulk of the wealth created by the bank merger deal.

2.6 Misvaluation Hypothesis: Multivariate Test

Misvaluation proxies can be correlated with growth prospects for both "inherent confounding" and "measurement confounding" reasons. First, investors may for psychological reasons overvalue growing firms (Lakonishok, Shleifer, and Vishny, 1994). Second, measurement error in the mispricing proxy may be correlated with growth opportunities, as market price in *P/B* and *P/V* manifests the market's rational assessment of future growth opportunities, not just pricing errors.

The superiority of *P/V* is that it takes into account analyst forecasts of future earnings and hence addresses the mismeasurement confounding limitation. To address the inherent confounding while also resolving any remaining mismeasurement confounding effects, we follow Dong et al. (2006) by using multivariate testing to assess the effect of misvaluation, *P/V*, and control for growth prospects by *P/B (2 years before)*. Since *P/B (2 years before)* is distant from the present, it will not take away part of the misvaluation effect that we want to assess.

Consequently, we perform multivariate analysis with additional controls as described in Tables 2.9 and 2.10. The regressions include geographic and activity diversification dummies, size variables, and leverage as control variables. The rationale for including leverage as a control variable stems from theories of financing

and capital structure, which predict that leverage levels are likely to be related to a firm's growth opportunities. Therefore, it is possible that leverage and financing constraints influence bidder behavior (Dong et al., 2006).

Table 2.9 reports logistic regression results relating bidder and target valuation measures to the means of payment. The dependent variable, stock, is a dummy variable that takes the value of 1 when the deal is paid with stock and zero otherwise. We run regressions both on P/V and P/V ranks. First, we regress *stock* on bidder and target *P/B (2 years before)*. Second, we regress *stock* on bidder and target *P/Vs*, shown in columns (2) and (3). Third, we include both *P/B (2 years before)* and *P/V* ranks (see columns (4) and (5)) to examine whether there is incremental explanatory power from acquirer *P/V* as a misvaluation measure given *P/B (2 years before)*.

The multivariate findings for target valuations in Table 2.9 are generally consistent with those of the univariate analysis. The regression results demonstrate that a higher target *P/B (2 years before)* is associated with more frequent use of stock than cash. This holds in all three types of regression specifications, suggesting that bidders view targets as having valuable growth options. Since growth prospects are subject to uncertainty, this explains why bidders are more likely to use their overvalued equity rather than cash for the right to exercise such options. It is interesting to note that the significance and magnitude of the coefficient of the target *P/B (2 years before)* is substantially higher than that of the bidder *P/B (2 years before)*. This suggests that the use of stock in bank mergers is influenced more by the growth prospects of targets than those of bidders. Consistent with the univariate analysis reported in Section 4.2, both bidder and target *P/V* measures are positively associated with more frequent use of stock, and the results are robust when *P/B (2 years before)* and control variables are included in the regression. In regressions (2) and (3), the coefficient of the target *P/B (2 years before)* remains positive and statistically significant while that of the bidder *P/B (2 years before)* becomes insignificant when we account for the impact of target and bidder *P/V*. This supplements evidence suggesting that bidders' growth prospects have no impact on the use of stock in bank mergers. The coefficients for both bidder *P/V* and *P/V (k=12.5%)* are 0.775 and 0.741 in the second and third regressions, respectively (both significantly positive at the 1% level). These bidder *P/V* regression coefficients are consistent with the view that bidder overvaluation, not its growth prospects, dictates the choice of stock payment. It is worthwhile to highlight that the positive and

statistically significant coefficient of target *P/V* overvaluation also increases the probability of using stock in bank merger deals. When we run the regression on bidder and target P/V ranks, we get similar results, as shown in columns (4) and (5), respectively.

Next we examine the relation between premium and announcement cumulative abnormal returns (CAR (-2, 2)) for both bidders and targets, and our key overvaluation measures, controlling for other effects as in Table 2.9. These regression results are reported in Table 2.10. Consistent with the univariate findings, Panel A of Table 2.10 indicates that higher bidder valuations, indicated by a higher rank for the bidder's *P/V* and *P/V (k=12.5%)*, are associated with higher bid premiums.[6] However, the growth prospects don't have significant influence on the premiums paid.

Panel B of Table 2.10 shows that the growth prospects of target and bidder have no bearing on bidder and target abnormal announcement returns. Hence, the market's reaction to bank mergers is not driven by the growth prospects of the merging banks. Consistent with the findings of the univariate analysis, we find that higher bidder valuation (*P/V*), which mainly measures the misvaluation component of stock price, is associated with lower bidder returns. This inverse relation implies that the market's negative reaction is influenced by the bidder's overvaluation. The last three regressions of Panel B (Table 2.10) show that the target abnormal returns in response to bank acquisition announcements have a positive, but tenuous association with bidders' overvaluation after controlling for other effects.

2.7 Discussion

In this section, we review and discuss the most important empirical findings of the previous four sections. According to the misvaluation hypothesis of Shleifer and Vishny (2003), managers value firms rationally, whereas investors do not. Bidders acquire undervalued targets (i.e., relative to fundamentals) using cash, but purchase targets with equity when their equity is more overvalued than that of targets. On the other hand, managers of target firms accept equity offers if the target is also overvalued, as takeovers give target management the opportunity to cash out illiquid stock or option holdings. In general, the misvaluation hypothesis mirrors the insight

[6] The result concerning the positive relation between bidder's P/V rank and premium is still consistent when we add geographic diversification, activity diversification and leverage as controls But due to the great reduction of sample size (more than 60% smaller), when relative size (the market value of bidder/the market value of target) and deal size are added to the regression, the relation becomes vague, so we don't present here.

that the willingness of target management to cash out tends to be greater when the target is more overvalued. Furthermore, bidder and target misvaluation creates different strategic incentives that influence not only the means of payment (as described above), but also the premium paid and the abnormal returns.

Following Dong et al. (2006), we distinguish the misvaluation hypothesis from the *Q* hypothesis. According to the *Q* hypothesis, takeovers redeploy target assets to different uses (Lang et al., 1989; Servaes, 1991; Jovanovic and Rousseau, 2002). The payoffs from such target asset redeployment hinges on the quality of bidder and target management, as well as on the growth prospects of bidders and targets. Tobin's *Q*, the ratio of firm market value to book value, provides a measure of the bidder or target's ability to create value from existing assets. The *Q* hypothesis of acquisitions predicts that acquisitions involving bad targets (with lower valuation) and good bidders (with higher valuation) generate greater total gains than transactions involving good targets and bad bidders. Thus, higher bidder valuation and lower target valuation are supposed to be associated with high bidder and target returns (Lang et al., 1989; Servaes, 1991), and Dong et al. (2006)), and higher bid premiums as well. Controlling for *P/B (2* years before), *P/V* provides a more rigorous test for the misvaluation hypothesis.

2.7.1 Relative Bidder-target Valuations

As shown in Section 4.1, bidders involved in deals targeting public firms have valuation ratios that are higher, on average, than those of their targets (both *P/B (2 years before)* and *P/V*). This is consistent with the misvaluation hypothesis. Similar to the findings of Dong et al. (2006) for industrial firms, this relationship is strong for equity offers, but for cash offers, the findings appear to be mixed. Section 4.1 also shows that the equity bidders are more overvalued than the cash bidders; the bidder–target difference in valuation is, on average, greater in equity offers than in cash offers. Under the misvaluation hypothesis, a profitable equity offer requires the bidder to be overvalued relative to the target, and the target managers are more likely to accept the equity bid and cash out when the target is overvalued. Since the less overvalued bidders are more likely to execute takeover deals using cash, the bidder–target difference in cash deals should be smaller. Our results in Section 4.1 show that equity offers are associated with higher bidder valuations than cash offers, and the bidder–target difference in valuation is, on average, greater among equity

offers than cash offers.

2.7.2 Target Valuation and Takeover Characteristics

As shown in Section 4.2, targets with higher growth prospects (*P/B (2* years before)) are associated with greater use of equity as a means of payment, consistent with the misvaluation hypothesis. According to Shleifer and Vishny (2003), overvalued targets are more likely to receive equity offers since managers at overvalued targets are willing to cash out even to relatively overvalued equity bidders. If target firms resist selling when they are undervalued, the bidders may seek to circumvent target management using a cash tender offer.

The Q hypothesis predicts that greater total gains are generated by acquisitions involving bad targets (low *P/B*) and good bidders (high *P/B*) than transactions involving good targets (high *P/B*) and bad bidders (low *P/B*). Our empirical results do not seem to provide strong support for the Q hypothesis.

According to the misvaluation hypothesis, greater undervaluation increases a target's incentive to fight to maintain a premium (or avoid a discount) relative to fundamental value, and the bidder has a stronger incentive to increase its bid relative to the market in order to ensure success. Thus, more undervalued targets (*P/B* or *P/V*) should earn higher premiums relative to the market price. Our evidence in Panel B2 of Table 2.3 and Panel A of Table 2.10 shows that premiums and target announcement-period returns are both higher on average for low-valuation targets. This is consistent with the assertion that undervalued targets fight for a higher premium (relative to an unduly low market price), and takeover bids act to correct preexisting target mispricing (Dong et al., 2006).

2.7.3 Bidder Valuation and Takeover Characteristics

Section 4.2 shows that equity bidders are more overvalued than cash bidders. Likewise, higher bidder valuation is associated with greater use of equity. Both findings are consistent with the hypothesis that overvalued bidders are more likely to acquire target resources using their overpriced stock as currency.

Both our univariate and multivariate analysis find that higher bidder valuation is associated with higher bid premium, which supports the misvaluation hypothesis. It is possible that the overvalued bidders either find it easier to raise enough capital to

make a high bid, or are more willing to make a high bid using their overvalued stock.

Our univariate analysis documents that higher bidder valuation (both *P/B* and *P/V* measures) is associated with higher target stock returns, and that higher bidder valuation (both *P/V* measures) is associated with lower bidder announcement-period returns, both providing additional support for the misvaluation hypothesis. The relation between bidder valuation and bidder market returns is also robust in our multivariate analysis. According to the misvaluation hypothesis, the market tends to mistakenly believe that the bidder is paying too much in equity offers, for the market overvalues the equity offered more than it overvalues the target assets. Thus, investors tend to view an offer by an undervalued bidder as a masterful stroke, and an offer by an overvalued bidder as a clumsy blunder (Dong et al., 2006). The investors view the target of an overvalued bidder as a beneficiary of this good deal.

2.7.4 Some New Findings

Our results in Panels D1 and D2 of Table 2.3 in Section 4.3 indicate that a higher bidder valuation decreases the likelihood of merging with public target firms, and increases the likelihood of offering stock payment. Thus, the shareholders of private targets are more likely to accept stock exchange mergers (even when the bidders' stocks are overvalued) than cash payments. By exchanging stock, shareholders of private companies become shareholders of public companies, which could raise their reputation and diversify their investment, which is consistent with the misvaluation hypothesis.

The results in Panels A2 and B2 of Table 2.4 show that the short-term combined returns of the two parties are positive for both cash and stock deals. Mergers executed with stock payment generate higher returns, due primarily to the positive returns of targets.

Diversification and financial constraints also influence the merger wealth effects. Based on Table 2.6, 2.7 and 2.8, both geographic and activity diversification create wealth for the targets. Moreover, as shown in Table 2.10, the higher the financial leverage of the bidder, the less wealth is created for bidder and target shareholders around the announcement.

2.8 Summary and Conclusion

Much research has been conducted into U.S. banking merger activities. In

contrast to earlier studies, in this study we examine whether inefficient stock market misvaluation is an important driver of U.S. banking mergers. The advantage of focusing on a specific industry is that it can minimize the inter-industry disturbances and provide industry-specific insights for future research.

To test whether the theoretical framework of Shleifer and Vishny (2003) fits banking mergers, we use two measures of valuations for bidders and targets: price-to-book (*P/B (2 years before)*) and price-to–residual income valuation (*P/V*). Since *P/B (2 years before)* incorporates the growth prospects of the firms, *P/V* becomes a stringent evaluator of misvaluation. *P/B (2 years before)*, which stands for the firm's growth prospects, helps us differentiate the *Q* hypothesis—that high-quality bidders improve bad targets more than bad bidders improve good targets—from the misvaluation hypothesis. Following Dong et al. (2006), the intrinsic value (*V*) is estimated using the three-period forecast horizon residual income model of Ohlson (1995) and the perpetual residual income model that does not rely on analysts' forecasts of future earnings prospects, which allows us to estimate *V* for a much larger sample of banks. Hence, unlike previous studies, our analysis uses two *P/V* measures in testing the overvaluation hypothesis.

In our univariate tests, the empirical results obtained generally support the misvaluation hypothesis. With both measures, bidders are more highly valued relative to their targets in the full sample, especially among equity offers. More highly valued bidders are more likely to use stock and less likely to use cash as consideration, are willing to pay more relative to the target market price, are more likely to acquire private targets than public targets, and earn lower announcement-period returns. Higher valuation targets receive lower premium relative to market price, are more likely to receive equity offers, and experience lower announcement period returns (in univariate tests).

A number of studies, including Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004), develop models in which merger waves result from managerial timing of market overvaluations of their firms. In addition, several studies, including Bouwman, Fuller, and Nain (2004) and Verter (2003), conduct empirical research on the aggregate valuation and the takeover market. These empirical studies confirm that there are long-term swings in market valuation and aggregate takeover activity, and offer support for the view that valuations affect takeover activity. A challenge for this literature is the fact that the effective sample size is reduced by the

low frequency of merger waves, and the fact that aggregate measures mix the effects of bidder and target valuations. Our tests therefore complement these papers. However, none of the extant research focuses on the banking industry. To fill this niche, we challenge the traditional views of banking mergers and find considerable evidence documenting the relationship between stock market valuation and banking mergers, as well as the monitoring theory and diversification theory.

We investigate banking mergers by classifying them into public targets and private targets and test diversification and monitoring effects at the same time. The monitoring hypothesis is supported by mergers with stock payment, whereas liquidity effects play a role in mergers executed using cash payment. Compared with DeLong (2001), who uses data from 1988 to 1995, we use a larger sample during a longer horizon, offering a more comprehensive picture of banking mergers based on diversification. Consistent with Delong (2001), geographic and activity diversification tend to decrease bidding firms' value, reflected by the bidder's negative abnormal returns around the merger announcement, but they increase target firms' value. When banks merge with private targets, diversification does not significantly influence the bidders' wealth. Activity diversification also plays a significant role in influencing whether the bidder make a full acquisition, as well as the payment premium.

We try to make a comprehensive investigation into U.S. banking mergers, and make several contributions to the existing literature. There is no reason to believe that banking mergers are motivated only by misvaluation, while it is a strong driver, other factors can also play an important (e.g., improving performance by diversifying). Our sample encompasses banking mergers targeting both public and private banks, and offers some intriguing insights into the differences between the two types. Our findings support the monitoring effects theory and the misvaluation theory.

Table 2.1
Descriptive Statistics for U.S. Bank Merger Bids

Panel A: Frequency Description

This table provides descriptive statistics for the entire sample, including all 2,148 U S banking bids during 1985–2006 Panel A reports the number of bank merger bids, number using stock payment, number of bids aiming at public targets, cross-state bids, nominal and inflation-adjusted average deal value, nominal and inflation-adjusted average market value of bidders, nominal and inflation-adjusted average market value of targets, by calendar year "Inflation adjusted" means that the deal value and the market prices have been adjusted to the Gross Domestic Product Implicit Price Deflator composed by the U S Department of Commerce Bureau of Economic Analysis*, 2005 as the base year *(http //www bea gov/national/nipaweb)

Year	Bank Mergers	Stock Payment	Public Targets	Private Targets	Cross-state Bids	Average Deal Size ($mil)		Average Market Value of Bidders ($mil)		Average Market Value of Targets ($mil)	
						Nominal	Inflation Adjusted	Nominal	Inflation Adjusted	Nominal	Inflation Adjusted
1985	18	12	11	7	9	96 17	155 91	NA	NA	NA	NA
1986	93	48	23	70	29	110 25	174 75	860 89	1364 56	307 57	487 52
1987	53	31	22	31	23	54 34	83 63	656 99	1011 11	176 42	271 51
1988	39	17	25	14	16	51 93	77 07	1084 1	1608 84	144 59	214 58
1989	65	39	34	31	21	62 38	89 38	1286 72	1843 57	201 62	288 87
1990	60	19	40	20	9	17 24	23 75	242 62	334 22	295 54	407 12
1991	66	39	39	27	22	197 61	263 24	1566 45	2086 68	269 8	359 4
1992	96	61	57	39	37	99 01	129 07	1866 97	2433 71	413 16	538 58
1993	161	95	85	76	51	91 43	116 62	2209 89	2818 77	310 21	395 68
1994	195	106	102	93	71	45 68	57 03	1624 04	2027 67	445 9	556 72
1995	205	88	137	68	57	238 34	291 69	2289 86	2802 42	496 44	607 56
1996	207	69	175	32	43	46 77	56 23	2215 41	2663 42	460 75	553 93
1997	190	122	122	68	71	408 17	482 08	2962 03	3498 36	799 88	944 71
1998	205	125	126	79	56	696 83	813 52	2713 81	3168 27	942 03	1099 78
1999	152	71	117	35	38	242 58	279 07	5907 92	6796 65	1410 62	1622 82
2000	130	45	114	16	34	398 27	447 98	7796 45	8769 61	1179 89	1327 17
2001	71	22	58	13	16	414 86	456 52	3916 51	4309 82	2994 44	3295 16
2002	22	6	13	9	6	31 97	34 64	3326 41	3604 54	95 38	103 35
2003	37	12	22	15	11	1466 5	1555 08	4120 34	4369 21	769 22	815 68
2004	40	16	22	18	12	306 26	315 31	4816 64	4958 91	1371 37	1411 88
2005	28	12	10	18	13	195 23	194 33	5732 18	5705 88	424 17	422 22
2006	25	8	15	10	16	170 54	164 37	12164 84	11724 47	264 16	254 6
Total	2148	1063	1369	779	661						
Average						247 38	284 6	3302 91	3709 56	655 86	760 9

Table 2.1 (continued)

Panel B: Median Size of Mergers, by Type

This panel reports the number of bank mergers and median deal size for each type of merger, classified by method of payment, type of target bank, geographic diversification (cross-state), and activity diversification

Merger Type	Number of Mergers	Median Deal Value ($mil)	Median Market Value of Bidders ($mil)	Relative Deal Size (Deal Value/Bidder MV)
All Mergers	2148	19 4	650 7	2 98%
Mergers with Stock Payment	1063	44 9	768 4	5 84%
Mergers with Cash Payment	1085	6 89	308 8	2 23%
Mergers with Public Targets	1369	22 01	1,261 91	1 74%
Mergers with Private Targets	779	17 95	395 33	4 54%
Geographic and Activity Diversification	143	65	1617 5	4 02%
Geographic and Activity Focus	1286	9 85	302 38	3 26%
Geographic Focus and Activity Diversification	199	31 78	249 3	12 75%
Geographic Diversification and Activity Focus	520	50 4	1,786 79	2 82%

Table 2.2
Mean Acquirer and Target Valuation Ratios by Method of Payment

Panel A: P/V Based on Three-period Forecast Horizon Residual Income Model

This panel reports how the two valuation measures, the price-to-book ratio *P/B (2 years before)* and the price-to–intrinsic income value ratio *P/V* are related to the type of target (public vs private) and method of payment The intrinsic value is estimated using a three-period forecast horizon residual income model, where the cost of capital ($r_e(t)$) is based on firm-specific CAPM and the discount rate is set at 12 5% The t-statistics of differences between acquirer and target and between stock and cash offers are reported in brackets The sample includes successful merger bids for both public and private targets during 1985–2006 N refers the number of bidders with valuation measures available ***, **, and * denote that the difference in means is significant at the 1%, 5%, and 10% levels, respectively

		Acquirer of Public Targets				Acquirer of Private Targets				
		(1) Acquirer	(2) Target	(1) - (2) [t-Statistic]	N	(3) Acquirer	N	(1) - (3) [t-Statistic]	(4) All Acquirers	N
Cash	*P/B (2 years before)*	2.74	2 78	-0.05 [-0 17]	341	1 09	99	1 64*** [5.31]	2.26	440
	P/V ($r_e(t)$=12 5%)	5 24	3 9	1 34* [1 662]	137	6 77	57	-1.53 [-1 31]	5.71	194
	P/V	5.52	6 62	-1.1 [-0 489]	137	9 02	57	-3.50* [-1 77]	6.54	194
Stock	*P/B (2 years before)*	4.49	1 94	2 55*** [9.80]	188	4 64	158	-0 15 [-0.42]	4.56	346
	P/V ($r_e(t)$=12 5%)	6.28	3.97	2 31** [3 00]	61	7 95	97	-1 67** [-2 17]	7.31	158
	P/V	7.82	4 63	3 19*** [2.7]	61	10 08	97	-2.26* [-1.7]	9 21	158
All	*P/B (2 years before)*	3.55	2.42	1 12*** [5.64]	529	3.36	292	0 19 [0.81]		
	P/V ($r_e(t)$=12 5%)	5.56	3.64	1.92*** [3 38]	198	7.54	154	-1 98*** [-2.73]		
	P/V	6.23	6 17	0.06 [0 03]	198	9.68	154	-3.45*** [-2.89]		

		(5) Acquirers of Public Targets	(6) Public Targets	(7) Acquirers of Private Targets	(8) All Acquirers
Stock–Cash (t-statistic)	*P/B (2 years before)*	1 75*** [6.10]	-0 84*** [-3.51]	3.55*** [9.6]	2 3*** [10 69]
Stock–Cash (t-statistic)	*P/V (K=12 5%)*	1 04 [1.25]	0.07 [1 00]	1.18 [1 01]	1 60** [2 3]
Stock–Cash (t-statistic)	*P/V*	2.3** [2.19]	-1.99 [-0.96]	1 06 [0 49]	2.67*** [2.59]

Table 2.2 (continued)

Panel B: P/V Based on Perpetual Residual Income Model

This panel reports how the two valuation measures, the price-to-book ratio *P/B (2 years before)* and the price-to–intrinsic value ratio *P/V* are related to the type of target (public vs private) and method of payment The intrinsic value is estimated using our constructed perpetual residual income model, when the cost of capital ($r_e(t)$) is based on firm-specific CAPM, as well as when the discount rate is set at 12 5% The t-statistics of differences between acquirer and target, and between stock and cash offers, are reported in brackets The sample includes successful merger bids aiming at both public and private targets during 1985–2006 N refers the number of bidders with valuation measures available ***,**,* denote that the difference in means is significant at the 1%, 5% and 10% level, respectively

		Acquirer of Public Targets				Acquirer of Private Targets				
		(1) Acquirer	(2) Target	(1) - (2) [t-Statistic]	N	(3) Acquirer	N	(1) - (3) [t-Statistic]	(4) All Acquirers	N
Cash	*P/B (2 years before)*	2.74	2.78	-0 05 [-0.17]	341	1 09	99	1 64*** [5.31]	2.26	440
	P/V ($r_e(t)$=12 5%)	3 44	1 61	1 42*** [8 51]	341	4 35	99	-0.91 [-1.26]	3.64	440
	P/V	3 69	1 39	2 05*** [6 13]	341	4 92	96	-1 23* [-1.8]	3.99	337
Stock	*P/B (2 years before)*	4 49	1.94	2 55*** [9 80]	188	4 64	158	-0.15 [-0 42]	4 56	346
	P/V ($r_e(t)$=12 5%)	4	1 84	2.17*** [4.08]	187	8 27	190	-4 26*** [-4.09]	6 15	346
	P/V	4.66	1 61	3 33*** [6 03]	183	9 5	180	-4 84*** [-4 12]	7 05	346
All	*P/B (2 years before)*	3 55	2.42	1.12*** [5 64]	529	3 36	257	0.19 [0.81]		
	P/V ($r_e(t)$=12 5%)	3.64	1.96	1.67*** [5.20]	528	6.92	154	-3.29*** [-3 47]		
	P/V	4.08	1.55	2.53*** [8.54]	524	7 98	154	-3.9*** [-3 71]		
		(5) Acquirers of	(6)			(7) Acquirers of			(8) All	
Stock–Cash (t-statistic)	*P/B (2 years before)*	1.75*** [6 10]	-0 84*** [-3.51]			3.55*** [9 6]			2.3*** [10 69]	
Stock–Cash (t-statistic)	*P/V ($r_e(t)$=12 5%)*	0 57 [1.10]	0 23 [1.38]			3 92*** [3.37]			2 5*** [3 81]	
Stock–Cash (t-statistic)	*P/V*	0.96* [1.75]	0.22* [1 84]			4 58*** [3.68]			3.06*** [4 32]	

Table 2.3
Mean Bank Merger Characteristics by Bidder or Target Valuation Ratio Quintiles

This table reports the relation between valuation measures of targets and bidders to takeover characteristics For the entire sample, acquirer and target firms are ranked by valuation ratios (*P/B (2 years before)* and *P/V*) and separated into quintiles and assigned a rank between 1 and 5, with 1 being the lowest ratio quintile (most undervalued) *P/B (2 years before)* is the price-to-book ratio *P/V* is the price-to-value ratio, where the intrinsic value is estimated using the residual income model when the cost of equity ($r_e(t)$) is estimated using firm-specific CAPM This table reports mean acquisition characteristics for each of the quintiles and difference in means between ranks 1 and 5 In panel B1 and D1, The intrinsic value is estimated using a three-period forecast horizon residual income model, In panel B2 and D2, the intrinsic value is estimated using our constructed perpetual residual income model Bid premium is the ratio of the bid price offered by the acquirer to the target stock price 5 days prior to the announcement of the takeover bid Acquirer and target cumulative abnormal returns (CAR) are measured over the 3 days (-1, 1) around the announcement (day 0) of the acquisition using the market model Cumulative average abnormal return (CAAR) is the average of all CAR in one quintile *N* is the total number of acquisitions in each quintile The sample includes merger announcements where the bidding bank is listed on the NYSE, AMEX, or NASDAQ during 1985–2006 ***, **, and * denote that the difference in means between ranks 1 and 5 is significant at the 1%, 5%, and 10% level, respectively, based on the two-sample *t*-test

			Probability of Stock Payment (%)	Probability of Merging with a Public Target (%)	Bid Premium (%)	Target Announcement CAAR (%)	Bidder Announcement CAAR (%)
Panel A: Mergers Sorted by Target P/B Ratio (2 years before the announcements)							
Target P/B Rank	N	Target P/B (t-2 years)					
1 (Low Growth Prospect)	55	0 86	21 09		52 83	11 45	0 82
2	55	1 21	37 27		21 24	10 18	-1 03
3	55	1 63	54 55		23 05	11 47	0 26
4	56	2 47	60 71		21 96	9 54	0 07
5 (High Growth Prospect)	56	5 89	39 43		4 37	5 82	1 00
Difference 5-1		5 02***	18 34		-48 46*	-5 63**	0 18
Panel B1: Mergers Sorted by Target P/V Ratio (three-period forecast horizon residual income model)							
Target P/V Rank	N	Target P/V					
1 (Undervalued)	14	0 35	0		0 79	0 39	0 49
2	14	0 78	0		0 26	1 21	2 02
3	14	1 37	0		1 77	1 48	1 48
4	14	2 36	14 29		4 63	4 42	2 39
5 (Overvalued)	14	4 96	14 29		9 68	1 82	0 85
Difference 5-1		4 61***	14 29		8 89**	1 43	0 36
Panel B2: Mergers Sorted by Target P/V Ratio (constructed perpetual residual income model)							
Target P/V Rank	N	Target P/V					
1 (Undervalued)	68	0 50	19 12		19 78	10 06	0 73
2	68	0 78	20 59		10 11	6 70	1 23
3	68	1 08	32 35		16 83	10 56	0 39
4	68	1 65	39 71		16 03	10 04	0 97
5 (Overvalued)	68	3 56	32 35		6 86	3 67	1 40
Difference 5-1		3 06***	13 24*		-12 92**	-6 39***	0 67
Panel C: Mergers Sorted by Bidder P/B Ratio (2 years before the announcements)							
Bidder P/B Rank	N	Bidder P/B (t-2 years)					
1 (Low Growth Prospect)	157	0 94	5 38	46 92	5 42	3 28	1 24
2	157	1 52	33 08	63 85	15 65	9 36	0 67
3	157	2 53	70 77	70 77	21 76	12 16	-0 25
4	157	3 90	75 00	65 91	46 25	10 48	-0 18
5 (High Growth Prospect)	158	8 45	80 15	62 60	32 03	13 46	-0 47
Difference 5-1		7 51***	74 77***	15 67**	26 61**	10 18***	-1 71***
Panel D1: Mergers Sorted by Acquirer P/V Ratio (three-period forecast horizon residual income model)							
Bidder P/V Rank	N	Bidder P/V					
1 (Undervalued)	72	1 11	15 28	80 56	7 66	4 3	1 72
2	72	2 63	36 11	55 56	13 01	10 33	0 14
3	71	4 64	56 34	46 48	18 45	9 47	0 34
4	71	8 11	64 79	52 11	25 6	8 25	-0 17
5 (Overvalued)	71	17 99	61 97	38 03	32 12	9 1	0 07
Difference 5-1		16 88***	46 69***	-42 53***	24 46**	4 80***	-1 65***
Panel D2: Mergers Sorted by Acquirer P/V Ratio (constructed perpetual residual income model)							
Bidder P/V Rank	N	Bidder P/V					
1 (Undervalued)	160	0 71	19 86	76 71	10 6	6 36	2 27
2	160	1 41	37 67	71 92	19 16	11 16	0 51
3	161	2 51	64 63	60 54	44 77	11 62	-0 54
4	161	5 17	63 95	64 63	26 25	11 18	0 05
5 (Overvalued)	161	17 7	61 9	40 82	22 36	6 95	0 13
Difference 5-1		16 99***	42 04***	-35 89***	11 76**	0 59	-2 14***

Table 2.4
Daily AAR and CAAR around Bank Merger Announcements

This table presents daily average abnormal return (AAR) and cumulative average abnormal return (CAAR) for both acquirers and targets for stock (Panels A1 and A2) and cash (Panels B1 and B2) deals, using the market model The sample of the bidders paying in stock (cash) consists of 1,094 (1,098) successful acquisition deals completed over the 1985–2006 period for short-term analysis, as identified in the Thomson ONE Banker Database We estimate AAR and CAAR using the market model with the following regression

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt}$$

The abnormal return for the stock of firm j on day t is defined as the difference between the actual return on day t and the estimated return from the estimation period

$$AR_{jt} = R_{jt} - (\hat{\alpha}_j + \hat{\beta}_j R_{mt})$$

AAR_t) is the sample mean on trading day t

$$AAR_t = \frac{\sum_{j=1}^{N} AR_{jt}}{N}$$

Over an interval of two or more trading days beginning with day T_1, and ending with day T_2, the CAAR are

$$CAAR_{T_1 T_2} = \frac{1}{N} \sum_{j=1}^{N} \sum_{t=T_1}^{T_2} AR_{jt}$$

Standardized cross-sectional t-statistics are reported in brackets ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively, using a one-tailed test

Table 2.4 (continued)

Panel A1: Daily AAR for Deals with Stock Payment Deals

This panel reports daily AAR for deals with stock payment

Window (day1, day2)	(1) Bidders of Public Targets (492 deals)	(2) Targets that are publicly listed firms (492 deals)	(3) Bidders of Private Targets (602 firms)	(1) - (2)	(1)- (3)
-10	-0 07% [-0 82]	[0 10%] 0 41	-0 15% [-1 451]	-0 17% [-0 66]	0 08% [0 6]
-9	0 00% [0 57]	0 32%** [2 37]	0 02% [-0 788]	-0 32%** [-2 37]	-0 02% [-0 79]
-8	0 01% [-0 23]	0 23%** [2 00]	0 02% [0 472]	-0 22%* [-1 79]	-0 01% [-0 16]
-7	-0 02% [0 25]	0 46%*** [5 16]	-0 14% [-1 085]	-0 48%*** [-4 02]	0 12% [0 79]
-6	-0 06% [-1 09]	0 78%*** [7 81]	0 07% [0 477]	-0 84%*** [-7 37]	-0 13% [-0 83]
-5	0 00% [-0 08]	0 22%** [1 99]	0 00% [-0 575]	-0 22%** [-1 99]	0 00% [0]
-4	-0 03% [-0 81]	0 48%*** [3 93]	0 02% [0 143]	-0 51%*** [-4 00]	-0 05% [-0 35]
-3	-0 16% [-1 41]	0 78%*** [7 44]	-0 13% [-0 802]	-0 94%*** [-6 09]	-0 03% [-0 15]
-2	0 16% [1 47]	0 90%*** [8 70]	0 06% [0 516]	-0 74%*** [-4 93]	0 10% [0 63]
-1	-0 02% [-0 06]	1 53%*** [14 02]	-0 05% [-0 926]	-1 55%*** [-4 68]	0 03% [0 09]
0	-1 36%*** [-19 01]	9 13%*** [92 56]	0 06% [0 788]	-10 49%*** [-86 10]	-1 42%*** [-13 59]
1	-0 48%*** [7 23]	4 35%*** [43 00]	0 03% [-0 104]	-4 83%*** [-39 93]	-0 51%* [-1 72]
2	-0 25%*** [-3 057]	-0 04% [0 614]	-0 07% [-0 93]	-0 21%** [-2 01]	-0 18% [-1 62]
3	-0 17%* [-1 821]	0 03% [-0 539]	-0 03% [-0 715]	-0 20%* [-1 84]	-0 14% [-1 37]
4	-0 05% [-0 72]	0 01% [0 064]	-0 14%* [-1 899]	-0 06% [-0 35]	0 09% [0 89]
5	-0 07% [-0 77]	-0 06% [-0 188]	-0 01% [0 384]	-0 01% [-0 03]	-0 06% [-0 63]
6	-0 05% [-0 5]	0 10% [0 964]	0 03% [0 351]	-0 15% [-1 04]	-0 08% [-0 61]
7	-0 01% [0 16]	-0 03% [-0 142]	-0 15% [-1 544]	0 02% [0 09]	0 14% [1 21]
8	0 10% [0 66]	-0 06% [-0 66]	0 01% [0 943]	0 16% [0 9]	0 09% [0 59]
9	-0 06% [-0 96]	0 13% [1 578]	-0 08% [-0 591]	-0 19%* [-1 84]	0 02% [0 13]
10	-0 07% [-0 92]	-0 01% [-0 617]	-0 10% [-0 729]	-0 06% [-0 77]	0 03% [0 19]

Table 2.4 (continued)

Panel A2: CAAR for Stock Payment Deals

This panel reports CAAR for deals with stock payment

Window (day1, day2)	(1) Bidders of Public Targets (492 deals)	(2) Targets that are publicly listed firms (492 deals)	(3) Bidders of Private Targets (602 firms)	(1) - (2)	(1) + (2)	(1) - (3)
(-1,0)	-1 38%*** [-13 49]	10 62%*** [75 23]	0 01% [-0 09]	-12 00%*** [-68 83]	9 24%*** [53 00]	-1 39%*** [-9 57]
(-1,+1)	-1 86%*** [-15 19]	14 98%*** [86 24]	0 04% [-0 14]	-16 84%*** [-79 25]	13 12%*** [61 74]	-1 90%*** [-6 11]
(-2,0)	-1 21%*** [-10 16]	11 53%*** [66 40]	0 07% [0 22]	-12 74%*** [-60 52]	10 32%*** [49 02]	-1 28%*** [-3 75]
(-2,+2)	-1 94%*** [-12 47]	15 84%*** [70 93]	0 03% [-0 29]	-17 78%*** [-65 34]	13 90%*** [51 08]	-1 97%*** [-10 58]
(-10,0)	-1 53%*** [-6 40]	14 91%*** [44 02]	-0 23% [-0 97]	-16 44%*** [-39 66]	13 38%*** [32 28]	-1 30%*** [-3 87]
(-10,+10)	-2 65%*** [-7 94]	19 34%*** [41 47]	-0 74%* [-1 76]	-21 99%*** [-38 35]	16 69%*** [29 11]	-1 91%*** [-3 56]

Table 2.4 (continued)

Panel B1: Daily AAR for Deals with Cash Payment Deals

This panel reports daily AAR for deals with cash payment

Day	(1) Bidders of Public Targets (n=877)	(2) Targets that are publicly listed firms (n=877)	(3) Bidders of Private Targets (n=211)	(1) - (2)	(1) - (3)
-10	0 08% [0 42]	0 09% [0 86]	-0 05% [-0 19]	-0 01% [-0 05]	0 13% [0 4]
-9	-0 06% [-1 10]	-0 04% [-0 73]	0 06% [0 1]	-0 02% [-0 26]	-0 12% [-0 21]
-8	0 03% [0 52]	0 13% [0 68]	-0 12% [-0 42]	-0 10% [-0 5]	0 15% [0 51]
7	0 15% [1 37]	0 16%* [1 73]	-0 24%** [-2 18]	-0 01% [-0 07]	0 39%** [2 51]
-6	-0 04% [-1 00]	0 10% [0 62]	-0 09% [-1 25]	-0 14% [-0 86]	0 05% [0 61]
-5	-0 02% [-0 44]	0 04% [0 60]	0 15% [0 76]	-0 06% [-0 74]	-0 17% [-0 84]
-4	-0 07% [-0 72]	0 16%* [1 72]	0 05% [1 16]	-0 23% [-1 71]	-0 12% [-1 13]
-3	0 13% [1 54]	0 05% [1]	-0 53%*** [-4 36]	0 08% [0 82]	0 66%*** [4 46]
-2	0 00% [-0 13]	0 14% [1 57]	-0 05% [-0 65]	-0 14% [-1 57]	0 05% [0 65]
-1	0 16%* [1 69]	0 57%*** [6 09]	0 18% [1 58]	-0 41%** [-2 36]	-0 02% [-0 13]
0	1 04%*** [15 56]	2 82%*** [34 06]	0 22% [1 14]	-1 78%*** [-16 73]	0 82%*** [4 03]
1	0 53%*** 8 063	1 42%*** [18 67]	-0 04% [-0 08]	-0 89%*** [-8 85]	0 57% [1 09]
2	0 30%*** 4 093	0 20%*** [2 95]	0 07% [1 02]	0 10% [1]	0 23%** [2 29]
3	-0 01% [-0 642]	0 03% [-0 43]	-0 05% [-1 29]	-0 04% [-0 56]	0 04% [0 96]
4	0 06% [0 874]	0 02% [0 62]	0 05% [-0 04]	0 04% [0 53]	0 01% [0 01]
5	0 05% [0 159]	0 05% [-0 03]	0 13% [1 09]	0 00% [0]	-0 08% [-0 24]
6	-0 06% [-0 836]	0 01% [-0 08]	-0 01% [0 12]	-0 07% [-0 52]	-0 05% [-0 45]
7	0 09% [0 07]	0 05% [0 25]	-0 01% [0 17]	0 04% [0 03]	0 10% [0 08]
8	0 03% [1 368]	-0 02% [0 93]	0 07% [0 05]	0 05% [1 62]	-0 04% [-0 03]
9	-0 05% [-1 483]	-0 01% [-1 04]	0 04% [0 87]	-0 04% [-1 14]	-0 09% [-1 58]
10	0 04% [0 008]	0 05% [0 017]	0 01% [0 09]	-0 01% [0]	0 03% [0 01]

Table 2.4 (continued)

Panel B2: CAAR for Cash Payment Deals

This panel reports CAAR for deals with cash payment

Window (day1, day2)	(1) Bidders of Public Targets (n=877)	(2) Public Targets (n=877)	(3) Bidders of Private Targets (n=211)	(1) - (2)	(1) + (2)	(1) - (3)
(-1,0)	1 20%*** [12 20]	3 38%*** [28 36]	0 40%* [1 92]	-2 18%*** [-14 10]	4 58%*** [29 63]	0 80%*** [2 88]
(-1,+1)	1 74%*** [14 62]	4 80%*** [33 93]	0 36% [1 53]	-3 06%*** [-16 55]	6 54%*** [35 37]	1 38%*** [5 07]
(-2,0)	1 20%*** [9 89]	3 52%*** [24 05]	0 34% [1 20]	-2 32%*** [-12 20]	4 72%*** [24 82]	0 86%*** [2 71]
(-2,+2)	2 04%*** [13 09]	5 14%*** [28 30]	0 38% [1 35]	-3 10%*** [-12 95]	7 18%*** [30 00]	1 66%*** [4 93]
(-10,0)	1 40%*** [5 34]	4 21%*** [14 50]	-0 42% [-1 30]	-2 81%*** [-7 18]	5 61%*** [14 34]	1 82%*** [3 27]
(-10,+10)	2 39%*** [6 41]	6 01%*** [15 26]	-0 16% [-0 50]	-3 62%*** [-6 68]	8 40%*** [15 49]	2 55%*** [3 82]

Table 2.5
Bank Merger Long-term CAAR

This table presents long-term cumulative average abnormal returns (CAAR), calculated using the market model and Fama and French (1993) 3-factor model, for bidders using stock and cash payment The sample of the bidders paying stock (cash) consists of 1,063 (1,085) successful acquisition deals completed over the 1985–2006 period for 1- and 2-year analysis, as identified in the Thomson ONE Banker Database Panels A1 and A2 report abnormal returns for acquirers for stock deals Panels B1 and B2 report abnormal returns for acquirers in cash deals

In Panels A1 and B1, we estimate CAAR using the market model with the following regression

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt}$$

The abnormal return for the stock of firm j on day (month) t is defined as the difference between the actual return on day (month) t and the estimated return from the estimation period

$$AR_{jt} = R_{jt} - (\hat{\alpha}_j + \hat{\beta}_j R_{mt})$$

Over an interval of two or more trading days beginning with day (month) T_1, and ending with day (month) T_2, the CAAR are

$$CAAR_{T_1 T_2} = \frac{1}{N}\sum_{J=1}^{N}\sum_{t=T_1}^{T_2} AR_{jt}$$

We also estimate long-term CAAR using the Fama and French 3-factor model with the following regression

$$R_{jt} = \alpha + \beta_j R_{mt} + s_j SMB_t + h_j HML_t + \varepsilon_{jt}$$

The abnormal return for the common stock of firm j in month t is

$$AR_{jt} = R_{jt} - (\hat{\alpha}_j + \hat{\beta}_j R_{mt} + \hat{s}_j SMB_t + \hat{h}_j HML_t)$$

Over an interval of two or more trading months beginning with month T_1, and ending with month T_2, the CAAR are

$$CAAR_{T_1 T_2} = \frac{1}{N}\sum_{J=1}^{N}\sum_{t=T_1}^{T_2} AR_{jt}$$

Table 2.5 (continued)

Panel A: Long-term CAAR for Bidders Using Stock Payment

This panel reports the long-term CAAR for acquirers using stock payment In Panel A1, we estimate CAAR using the market model In Panel A2, we estimate CAAR using the Fama and French 3-factor model We report CAAR by the type of target (public or private) In Panels A1 and B1, standardized cross-sectional t-statistics are reported in brackets ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively, using a one-tailed test

Panel A1: Long-term CAAR for Stock Payment Deals Using the Market Model

Window (month1, month2)	Bidder CAAR		
	(1) Public Targets (n=492)	(2) Private Targets (n=615)	Diff (1) - (2)
(-12, -1)	8 13%*** [6 47]	5 28%*** [3 72]	2 85% [1 61]
(-1,0)	-0 81%* [-1 56]	0 23% [0 29]	-1 04%* [-1 75]
(-1,+1)	-0 85% [-1 25]	0 44% [0 99]	-1 29%* [-1 83]
(+1,+12)	0 63% [0 15]	-5 45%*** [-7 74]	6 08%*** [4 76]
(+1,+24)	-0 50% [-0 86]	-6 96%*** [-6 93]	6 46%*** [3 60]

Panel A2:
Long-term CAAR for Stock Payment Deals Using the Fama and French 3-factor Model

Window (month1, month2)	Bidder CAAR		
	(1) Public Targets (n=492)	(2) Private Targets (n=615)	Diff (1) - (2)
(-12, -1)	7 92%*** [5 75]	5 45%*** [4 14]	2 47% [1 00]
(-1,0)	-1 15%** [-2 93]	0 30%** [1 97]	-1 45%*** [-2 58]
(-1,+1)	-1 52%*** [-3 23]	0 46% [0 99]	-1 98% [-0 21]
(+1,+12)	-0 59%** [-2 40]	-5 20%*** [-3 88]	4 61%*** [5 70]
(+1,+24)	-1 83%* [-1 33]	-6 37%*** [-4 71]	4 54%*** [3 26]

Panel A3: Long-term CAAR for Stock Payment Deals Using the INV&IA-factor Model

Window (month1, month2)	Bidder CAAR		
	(1) Public Targets (n=476)	(2) Private Targets (n=572)	Diff (1) - (2)
(-12, -1)	13 05%*** [8 41]	20 82%*** [13 08]	-7 77%*** [-3 50]
(-1,0)	-0 42% [-0 89]	1 86%*** [4 42]	-2 28%*** [-3 60]
(-1,+1)	-0 02% [-0 03]	2 66%*** [5 04]	-2 68%*** [-3 34]
(+1,+12)	6 83%*** [4 80]	3 98%*** [3 91]	2 85% [1 63]
(+1,+24)	12 69%*** [6 18]	11 72%*** [7 03]	0 97% [0 37]

Table 2.5 (continued)

Panel B: Long-term CAAR for Bidders Using Cash Payment

This panel reports long-term CAAR for acquirers using cash payment In Panel B1, we estimate CAAR using the market model In Panel B2, we estimate CAAR using the Fama and French 3-factor model We report CAAR by the type of target (public or private) In Panels A1 and B1, standardized cross-sectional t-statistics are reported in brackets ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively, using a one-tailed test

Panel B1: Long-term CAAR for Cash Payment Deals Using the Market Model

Window (month1, month2)	Bidder CAAR		
	(1) Public Targets (n=876)	(2) Private Targets (n=217)	Diff (1) - (2)
(-12, -1)	-5 98%*** [-6 04]	2 98% [1 11]	-8 96%*** [-3 56]
(-1,0)	0 43% [1 26]	0 59%* [1 34]	-0 16% [-0 21]
(-1,+1)	-0 03% [-0 06]	1 25%** [1 97]	-1 28% [-1 46]
(+1,+12)	-0 71% [-0 89]	2 26% [0 91]	-2 97%* [-1 82]
(+1,+24)	0 80%* [1 54]	2 76%* [1 38]	-1 96% [-0 94]

Panel B2: Long-term CAAR for Cash Payment Deals Using the Fama and French 3-factor Model

Window (month1, month2)	Bidder CAAR		
	(1) Public Targets (n=870)	(2) Private Targets (n=219)	Diff (1) - (2)
(-12, -1)	-10 26%*** [-4 73]	0 50% [0 23]	-10 76%*** [-3 04]
(-1,0)	0 24% [0 69]	0 40% [0 59]	-0 16% [-0 73]
(-1,+1)	-0 26% [-0 66]	1 42%** [1 81]	-1 68%*** [-3 70]
(+1,+12)	-0 72% [-0 90]	0 90% [0 60]	-1 62% [-1 17]
(+1,+24)	2 98%*** [2 34]	3 40%* [1 60]	-0 42% [-0 13]

Panel B3: Long-term CAAR for Cash Payment Deals Using the INV&IA-factor Model

Window (month1, month2)	Bidder CAAR		
	(1) Public Targets (n=633)	(2) Private Targets (n=196)	Diff (1) - (2)
(-12, -1)	4 38%*** [3 278]	11 97%*** [5 318]	-7 59%*** [-2 90]
(-1,0)	1 89%*** [3 87]	2 22%*** [3 184]	-0 33% [-0 39]
(-1,+1)	2 31%*** [4 132]	3 38%*** [3 932]	-1 07% [-1 04]
(+1,+12)	11 66%*** [7 786]	12 00%*** [5 041]	-0 34% [-0 12]
(+1,+24)	29 44%*** [11 826]	19 73%*** [5 426]	9 71%** [2 20]

Table 2.6
CAAR for Geographic Focused vs. Diversifying Bank Mergers

This table reports the shareholder wealth effects of geographic diversification on 3-day cumulative average abnormal returns (CAAR(-1, +1)) For j^{th} firm, cumulative abnormal returns (CAR) is defined $CAR_{T_1 T_2} = \sum_{t=T_1}^{T_2} AR_{Jt}$ For each sample group, CAAR(-1, +1) is the average of all CAR(-1, +1) in the group Median CAR refers to the CAR(-1, +1) separating the higher half of a group from the lower half Combined returns are calculated by summing the CAR(-1, +1) of both partners in each deal around the announcements To test whether the median is statistically different from zero, t-statistics are used ***,**,* denote statistical significance at the 1%, 5%, and 10% level, respectively, using a one-tail test

Panel A: Entire Sample

The sample consists of 2,148 domestic U S bank mergers announced between 1985 and 2006 The sample is divided into groups according to geographic diversification A geographic focus merger is one in which both partners are located in the same U S state, diversifying mergers are those in which the bidder and target are located in different states

Merger Type	(1) Number of Mergers	Combined Returns for Partners			Bidders			Targets		
		(2) CAAR	(3) Median CAR	(4) % Positive	(5) CAAR	(6) Median CAR	(7) % Positive	(8) CAAR	(9) Median CAR	(10) % Positive
a CAAR										
Geographic Focus	1485	7 32%***	4 63%	77 35%	0 81%***	0 64%	59 60%	6 29%***	2 72%	78 67%
t-Statistics		[21 72]			[7 58]			[19 67]		
Geographic Diversification	663	13 00%***	10 87%	80 70%	-0 82%***	-0 62%	38 31%	15 00%***	12 47%	84 66%
t-Statistics		[19 69]			[-6 16]			[24 14]		
Total	2148	5 58%***	2 01%	66 99%	0 31%***	0 20%	52 95%	1 63%***	3 35%	80 13%
t-Statistics		[21 18]			[3 6]			[9 54]		
b Differences between Groups										
Geographic Focus vs Geographic Diversification		-5 68%***	-6 24%	-3 35%	1 63%***	1 26%	21 29%	-8 71%***	-9 75%	-5 99%
t-Statistics		[-7 66]			[3 08]			[-12 46]		

Table 2.6 (continued)

Panel B: Public Bidders Acquiring Public Targets

The sample consists of 1,369 domestic U S bank mergers, both sides of which are public banks, announced between 1985 and 2006 The sample is divided into groups according to geographic diversification A geographic focus merger is one in which both partners are located in the same U S state, diversifying mergers are those in which the bidder and target are located in different states ***,**,* denote statistical significance at the 1%, 5%, and 10% level, respectively, using a one-tailed test

Merger Type	(1) Number of Mergers	Combined Returns for Partners			Bidders			Targets		
		(2) CAAR	(3) Median CAR	(4) % Positive	(5) CAAR	(6) Median CAR	(7) % Positive	(8) CAAR	(9) Median CAR	(10) % Positive
a CAAR										
Geographic Focus	1051	7 20%***	4 57%	77 23%	1 01%***	0 87%	63 56%	6 15%***	2 67%	78 51%
t-Statistics		[17 88]			[7 61]			[16 1]		
Geographic Diversification	318	13 27%***	10 54%	80 47%	-1 69%***	-1 32%	30 82%	15 02%***	12 47%	85 52%
t-Statistics		[14 12]			[-7 77]			[16 68]		
Total	1369	8 56%***	5 67%	78 02%	0 38%***	0 47%	55 99%	8 14%***	3 27%	80 12%
t-Statistics		[22 49]			[3 24]			[21 98]		
b Differences between Groups										
Geographic Focus vs Geographic Diversification		-6 07%***	-5 97%	-3 24%	2 70%***	2 19%	32 74%	-8 87%***	-9 80%	-7 01%
t-Statistics		[-5 95]			[10 62]			[-9 08]		

Table 2.6 (continued)

Panel C: Comparison between the CAAR of Bidders for Public Targets and CAAR of Bidders for Private Targets

The sample consists of 1,369 domestic U S bank mergers, both sides of which are public banks, and 779 domestic U S bank mergers for private targets announced by public banks between 1985 and 2006 The sample is divided into groups according to geographic diversification A geographic focus merger is one in which both partners are located in the same U S state, diversifying mergers are those in which the bidder and target are located in different states ***,**,* denote statistical significance at the 1%, 5%, and 10% level, respectively, using a one-tailed test

Merger Type	Bidders of Public Targets				Bidders of Private Targets				Difference
	(1) Number of Mergers	(2) CAAR	(3) Median CAAR	(4) % Positive	(5) Number of Mergers	(6) CAAR	(7) Median CAAR	(8) % Positive	(2) - (6)
a CAAR									
Geographic Focus	1051	1 01%***	0 87%	63 56%	434	0 33%*	-0 03%	50 00%	0 68%***
t-Statistics		[7 61]				[1 82]			[3 06]
Geographic Diversification	318	-1 69%***	-1 32%	30 82%	345	-0 01%	-0 12%	46 38%	-1 68%***
t-Statistics		[-7 77]				[-0 08]			[-6 41]
Total	1369	0 38%***	0 47%	55 99%	779	0 18%	-0 06%	48 40%	0 20%
t-Statistics		[3 24]				[1 51]			[1 2]
b Differences between Groups									
Geographic Focus vs Geographic Diversification		2 70%***	2 19%	32 74%		0 34%	0 09%	3 62%	
t-Statistics		[10 62]				[1 47]			

Table 2.7
CAAR for Activity Focused vs. Diversifying Bank Mergers

This table reports the effects of activity diversification on 3-day cumulative average abnormal returns (CAAR(-1, +1)) For j^{th} firm, cumulative abnormal returns (CAR) is defined $CAR_{T_1 T_2} = \sum_{t=T_1}^{T_2} AR_{jt}$ For each sample group, CAAR(-1, +1) is the average of all CAR(-1, +1) in the group Median CAR refers to the CAR(-1, +1) separating the higher half of a group from the lower half Combined returns are calculated by summing the CAR(-1, +1) of both partners in each deal around the announcements To test whether the median is statistically different from zero, t-statistics are used ***,**,* denote statistical significance at the 1%, 5%, and 10% level, respectively, using a one-tailed test

Panel A: Entire Sample

The sample consists of 2,148 domestic U S bank mergers announced between 1985 and 2006 The sample is divided into groups according to activity diversification, which are classified by SIC codes If the first three digits of each party's SIC code are the same, the deal is classified as activity focus, otherwise it is classified as an activity diversification deal [7]

Merger Type	(1) Number of Mergers	Combined Returns for Partners			Bidders			Targets		
		(2) CAAR	(3) Median CAAR	(4) % Positive	(5) CAAR	(6) Median CAAR	(7) % Positive	(8) CAAR	(9) Median CAAR	(10) % Positive
a CAAR										
Activity Focus	1806	7 53%***	4 96%	77 84%	0 48%***	0 38%	56%	6 83%***	2 97%	79 39%
t-Statistics		[24 96]			[5 09]			[23 54]		
Activity Diversification	342	15 07%***	12 77%	78 97%	-0 59%***	-0 67%	39 36%	16 17%***	12 59%	83 64%
t-Statistics		[14 87]			[-2 9]			[16 66]		
Total	2148	5 58%***	2 01%	66 99%	0 31%***	0 20%	52 95%	8 29%***	3 35%	80 13%
t-Statistics		[21 18]			[3 6]			[27 88]		
b Differences between Groups										
Activity Focus vs Activity Diversification		-7 54%***	-7 81%	-1 13%	1 07%***	1 05%	16 64%	-9 34%***	-9 62%	-4 25%
t-Statistics		[-7 13]			[4 77]			[-9 22]		

[7] SIC Code Banks, non-United States chartered (6000), National Commercial Banks (6021), State Banks, member fed reserve (6022), Commercial Banks, nec (6029), Saving Institutions, federally chartered (6035), Saving Institutions, not federally chartered (6036), Credit Unions, Federally Chartered (6061), Credit Unions, not Federally Chartered (6062), Branches and agencies of foreign banks (6081), Foreign Trade & International Banking Institutions (6082), Personal Credit Institutions (6141), Short-Term Business Credit Institutions (6153), Offices of Bank Holding Companies (6712), Offices of Holding Companies, nec (6719)

Table 2.7 (continued)

Panel B: Public Bidders Acquiring Public Targets

The sample consists of 1,369 domestic U S bank mergers, both sides of which are public banks, announced between 1985 and 2006 The sample is divided into groups according to activity diversification, which are classified by the SIC codes If the first three digits of each party's SIC code are the same, the deal is classified as activity focus, otherwise it is classified as a diversification deal ***,**,* denote statistical significance at the 1%, 5%, and 10% level, respectively, using a one-tailed test

Merger Type	(1) Number of Mergers	Combined Returns for Partners			Bidders			Targets		
		(2) CAAR	(3) Median CAR	(4) % Positive	(5) CAAR	(6) Median CAR	(7) % Positive	(8) CAAR	(9) Median CAR	(10) % Positive
a CAAR										
Activity Focus	1150	7 40%***	4 75%	77 71%	0 67%***	2 91%	79 31%	6 70%***	0 72%	60%
t-Statistics		[19 37]			[5 18]			[18 23]		
Activity Diversification	219	14 99%***	13 09%	79 23%	-1 13%***	-0 98%	69 97%	16 08%***	13 19%	84 13%
t-Statistics		[8 89]			[-3 29]			[9 98]		
Total	1369	8 56%***	5 67%	78 02%	0 38%***	0 47%	55 99%	8 14%***	3 27%	80 12%
t-Statistics		[22 49]			[3 24]			[21 98]		
b Differences between Groups										
Activity Focus - Activity Diversification		-7 59%***	-8 34%	-1 52%	1 80%***	3 89%	9 34%	-9 38%***	-12 47%	-23 96%
t-Statistics		[-7 02]			[12 04]			[-8 19]		

Table 2.7 (continued)

Panel C: Comparison between the CAAR of Bidders for Public Targets and CAAR of Bidders for Private Targets

The sample consists of 1,369 domestic U S bank mergers, both sides of which are public banks, and 779 domestic U S bank mergers for private targets announced by public banks between 1985 and 2006 The sample is divided into groups according to activity diversification, which are classified by SIC codes If the first three digits of each party's SIC code are the same, the deal is classified as activity focus, otherwise it is classified as a diversification deal ***,**,* denote statistical significance at the 1%, 5%, and 10% level, respectively, using a one-tailed test

Merger Type	Bidders of Public Targets				Bidders of Private Targets				Difference
	(1) Number of Mergers	(2) CAAR	(3) Median CAR	(4) % Positive	(5) Number of Mergers	(6) CAAR	(7) Median CAR	(8) % Positive	(2) - (6)
A CAAR									
Activity Focus	1150	0 67%***	2 91%	79 31%	656	0 14%	-0 08%	48 32%	0 53%***
t-Statistics		[5 18]				[1 11]			[2 92]
Activity Diversification	219	-1 13%***	-0 98%	69 97%	123	0 37%	-0 03%	48 78%	-1 50%***
t-Statistics		[-3 29]				[1 13]			[-3 61]
Total	1369	0 38%***	0 47%	55 99%	779	0 18%	-0 06%	48 40%	0 20%
t-Statistics		[3 24]				[1 51]			[1 2]
B Differences between Groups									
Activity Focus - Activity Diversification		1 80%***	3 89%	9 34%		-0 23%	-0 05%	-0 46%	
t-Statistics		[7 13]				[-0 66]			

Table 2.8
CAAR for Geographic and Activity Focused vs. Geographic and Activity-diversifying Bank Mergers

This table reports the interaction effects of geographic and activity diversification on 3-day cumulative average abnormal returns (CAAR(-1, +1)) The sample consists of 2,148 domestic U S mergers announced between 1985 and 2006 between banking firms A geographic focus merger is one in which both partners are located in the same U S state, diversifying mergers are those in which the bidder and target are located in different states An activity-focusing merger is one in which both partners have SIC codes where the first three digits are the same

For j^{th} firm, cumulative abnormal returns (CAR) is defined $CAR_{T_1 T_2} = \sum_{t=T_1}^{T_2} AR_{jt}$ For each sample group, CAAR(-1, +1) is the average of all CAR(-1, +1) in the group Median CAR refers to the CAR(-1, +1) separating the higher half of a group from the lower half Combined returns are calculated by summing the CAR of both partners in each deal around the announcements To test whether the median is statistically different from zero, t-statistics are used ***,**,* denote statistical significance at the 1%, 5%, and 10% level, respectively, using a one-tailed test

Panel A: CAAR of Each Group

Merger Type	(1) Number of Mergers	Combined Returns for Partners			Bidders			Targets		
		(2) CAAR	(3) Median CAR	(4) % Positive	(5) CAAR	(6) Median CAR	(7) % Positive	(8) CAAR	(9) Median CAR	(10) % Positive
Geographic and Activity Focus	1286	6 45%***	4 19%	77 10%	1 01%***	0 83%	62 52%	5 14%***	2 34%	77 85%
t-Statistics		[19 28]			[8 81]			[16 59]		
Geographic and Activity Diversification	143	15 93%***	13 14%	77 08%	-0 67%**	-0 66%	38 30%	16 80%***	12 58%	83 33%
t-Statistics		[9 5]			[-2 28]			[10 43]		
Geographic Focus and Activity Diversification	520	12 24%***	8 70%	81 48%	-0 85%***	-0 60%	39 23%	14 17%***	11 45%	85 65%
t-Statistics		[18 53]			[-5 68]			[22 22]		
Geographic Diversification and Activity Focus	199	14 37%***	11 24%	79 49%	-0 53%*	-0 67%	39 80%	15 65%***	12 77%	84 62%
t-Statistics		[11 49]			[-1 9]			[13 09]		
Total	2148	5 58%***	2 01%	66 99%	0 31%***	0 20%	52 95%	8 29%***	3 35%	80 13%
t-Statistics		[21 18]			[3 6]			[27 88]		

Table 2.8 (continued)
Panel B: Differences between Groups

Merger Type	Combined Returns for Partners			Bidders			Targets		
	(2) CAAR	(3) Median CAR	(4) % Positive	(5) CAAR	(6) Median CAR	(7) % Positive	(8) CAAR	(9) Median CAR	(10) % Positive
Geographic/Activity Focus vs Geographic/Activity Div	-9 48%***	-8 95%	0 02%	1 68%***	1 49%	24 22%	-11 66%***	-10 24%	-5 48%
t Statistics	[-5 54]			[5 33]			[-7 11]		
Geographic/Activity Focus vs Geo Focus/Activity Div	-5 79%***	-4 51%	-4 38%	1 86%***	1 43%	23 29%	-9 03%***	-9 11%	-7 80%
t-Statistics	[-7 82]			[9 87]			[-12 74]		
Geographic/Activity Focus vs Geo Div/Activity Focus	-7 92%***	-7 05%	-2 39%	1 54%***	1 50%	22 72%	-10 51%***	-10 43%	-6 77%
t-Statistics	[-6 12]			[5 1]			[-8 51]		
Geographic/Activity Div vs Geo Focus/Activity Div	15 93%***	13 14%	77 08%	-0 67%**	-0 66%	38 30%	16 80%***	12 58%	83 33%
t-Statistics	[8 84]			[-2 03]			[9 7]		
Geographic/Activity Div vs Geo Div/Activity Focus	1 56%	1 90%	-2 41%	-0 14%	0 01%	-1 50%	1 15%	-0 19%	-1 29%
t-Statistics	[0 75]			[-0 35]			[0 57]		
Geographic Focus/Activity Div vs Geo Div/Activity Focus	-2 13%	-2 54%	1 99%	-0 32%	0 07%	-0 57%	-1 48%	-1 32%	1 03%
t-Statistics	[-1 51]			[-1 01]			[-1 09]		

Table 2.9

Logistic Regressions

This table reports the logistic regression results, which predict the probability of using stock payment for the deals The sample includes all banking merger announcements during 1985–2006 where need to calculate both *P/B (2 years before)* and *P/V P/B (2 years before)* is price-to-book ratio of the bidder. *P/V* is price-to-value ratio of the bidder, where the intrinsic value is estimated using our constructed perpetual residual income model when the cost of equity ($r_e(t)$) is estimated using firm-specific CAPM and 12.5%, respectively Stock = 1 if the bidder uses stock to pay for the deal, 0 for cash payment. Activity diversification = 1 if the acquirer and target have different first three digits of the COMPUSTAT SIC codes, 0 otherwise. Geographic Diversification = 1 if the acquirer and target are located in the different states; 0 otherwise Relative size = acquirer market value / target market value Deal size = announced transaction value Leverage = acquirer total debt / total assets For each coefficient, the second row reports the p-value

	Stock				
	(1)	(2)	(3)	(4)	(5)
Intercept	-2 161* [0 076]	-8.425*** [0 002]	-6 990*** [0.002]	-0 589** [0.021]	-0 581** [0.028]
Target P/B (2 years before)	1 366*** [0 002]	1 864** [0.011]	1.516** [0.012]	0.130** [0.024]	0 120* [0 059]
Bidder P/B (2 years before)	0 181* [0.076]	-0 079 [0 625]	-0 032 [0.836]	-0.01 [0.450]	-0.002 [0 909]
Target P/V		1.979** [0 028]			
Bidder P/V		0 775*** [0.005]			
Target P/V (k=12 5%)			1.006* [0.065]		
Bidder P/V (k=12 5%)			0.741*** [0.007]		
Target P/V Rank				0.012 [0.708]	
Bidder P/V Rank				0 185*** [0 000]	
Target P/V (k=12.5%) Rank					0.013 [0.690]
Bidder P/V (k=12 5%) Rank					0 132*** [0.004]
Activity Diversification	0.238 [0 699]	1.208 [0 223]	0 724 [0.381]	0.081 [0 331]	0.097 [0 277]
Geographic Diversification	1.100* [0 070]	0.367 [0.679]	0 229 [0.776]	0.035 [0.722]	0.031 [0.759]
Log of Relative Size	2.577* [0.059]	6 073** [0.033]	4.759* [0.051]	0 087** [0 029]	0 117*** [0 006]
Log of Deal Size	2 834** [0.050]	6.594** [0.030]	5.102** [0.047]	0.171** [0 017]	0.218*** [0 004]
Leverage	0 009 [0.787]	0 071 [0.167]	0.080 [0.113]	0.003 [0.596]	0 001 [0.842]
N	109	77	77	77	77
McFadden R-squared	0.274	0.547	0.471	0 383	0.324

Table 2.10
Least Squares Regressions

This table reports the ordinary least squares (OLS) regressions on offer price premium, bidder cumulative abnormal return (CAR) and target CAR Premium is defined as the bid price over the target's stock price 4 weeks before the takeover announcement minus 1, then times 100 Individual acquirer and target announcement-period cumulative abnormal returns (CAR) are measured over the 2-day event window (−1, 0), beginning 1 day before the announcement (day -1) and ending on the announcement day (day 0) of the acquisition The sample includes all announced banking merger deals in which both the acquirer and target are listed on the NYSE, AMEX, or NASDAQ during 1985–2006 and the data needed to calculate both *P/B (2 years before)* and *P/V* are available *P/B (2 years before)* is the price-to-book ratio *P/V* is the price-to-value ratio, where the intrinsic value is estimated using our constructed perpetual residual income model and the cost of equity ($r_e(t)$) is estimated using firm-specific CAPM and 12 5%, respectively *Stock* = 1 if the bidder uses stock to pay for the deal, 0 for cash payment *Activity diversification* = 1 if the acquirer and target share different first three digits of the COMPUSTAT SIC codes, 0 otherwise *Geographic diversification* = 1 if the acquirer and target are located in the same state, 0 otherwise *Relative size* = acquirer market value / target market value Deal size = announced transaction value Leverage = acquirer total debt / total assets For each coefficient, the second row reports the p-value

Panel A: OLS Regression on Premium

	Premium									
Intercept	25 846**	11 388	3 359	1 817	2 496	1 111	5 202	4 447	4 893	4 546
	[0 013]	[0 337]	[0 432]	[0 639]	[0 551]	[0 767]	[0 355]	[0 399]	[0 365]	[0 369]
Target P/B (2 years before)	-5 72	-2 594	-0 719	0 526	-1 278	0 300	-0 164	0 532	-0 548	0 379
	[0 107]	[0 487]	[0 374]	[0 489]	[0 121]	[0 698]	[0 847]	[0 512]	[0 515]	[0 641]
Bidder P/B (2 years before)	3 641	1 100	0 771	-0 179	1 213*	-0 069	0 493	-0 078	0 796	0 003
	[0 192]	[0 710]	[0 264]	[0 781]	[0 081]	[0 915]	[0 492]	[0 909]	[0 260]	[0 997]
Target P/V Rank			-2 800**	-1 306			-2 500*	-1 019		
			[0 028]	[0 266]			[0 059]	[0 424]		
Bidder P/V Rank			7 241***	3 550***			5 701***	2 968*		
			[0 000]	[0 010]			[0 000]	[0 051]		
Target P/V (k=12 5%) Rank					-1 322	-0 386			-1 313	-0 523
					[0 305]	[0 739]			[0 306]	[0 666]
Bidder P/V (k=12 5%) Rank					5 914***	2 865**			4 703***	2 671*
					[0 000]	[0 033]			[0 001]	[0 061]
Stock		36 498**		21 014***		21 807***		19 103***		18 617***
		[0 017]		[0 000]		[0 000]		[0 000]		[0 000]
Activity Diversification							7 905*	3 879	9 239**	5 048
							[0 057]	[0 329]	[0 025]	[0 199]
Geographic Diversification							12 737***	4 955	13 750***	6 128
							[0 002]	[0 225]	[0 001]	[0 126]
Leverage							-0 19	-0 199	-0 255	-0 243
							[0 254]	[0 203]	[0 121]	[0 115]
N	241	241	169	169	173	173	158	158	162	162
Adjusted R-squared	0 003	0 023	0 200	0 345	0 151	0 320	0 258	0 347	0 244	0 337

Table 2.10 (continued)
Panel B: OLS Regression on Bidder/Target CAR

	Dependent Variable					
	Bidder CAR(-2, 2)			Target CAR(-2, 2)		
Intercept	-0 040***	0 002	0 006	0 175**	0 259***	0 253***
	[0 007]	[0 950]	[0 814]	[0 013]	[0 002]	[0 003]
Target P/B (2 years before)	0 002	-0 004	-0 004	-0 006	-0 011	-0 010
	[0 740]	[0 596]	[0 574]	[0 777]	[0 679]	[0 733]
Bidder P/B (2 years before)	0 003**	0 004	0 004	0 005	0 007	0 006
	[0 024]	[0 128]	[0 137]	[0 427]	[0 499]	[0 572]
Target P/V		-0 002			-0 033	
		[0 753]			[0 171]	
Bidder P/V		-0 004*			0 001	
		[0 080]			[0 798]	
Target P/V (k=12 5%)			-0 001			-0 021
			[0 822]			[0 262]
Bidder P/V (k=12 5%)			-0 005*			0 002
			[0 061]			[0 705]
Activity Diversification	0 005	0 011	0 01	0 015	0 014	0 011
	[0 529]	[0 412]	[0 417]	[0 730]	[0 766]	[0 817]
Geographic Diversification	-0 004	0 006	0 006	0 040	0 085*	0 082*
	[0 657]	[0 643]	[0 638]	[0 350]	[0 082]	[0 095]
Log of Relative Size	-0 019**	0 013	-0 013	0 000	0 016	0 020
	[0 011]	[0 195]	[0 179]	[0 989]	[0 681]	[0 623]
Log of Deal Size	-0 026***	-0 018	-0 018*	-0 010	0 024	0 027
	[0 002]	[0 110]	[0 100]	[0 792]	[0 580]	[0 536]
Leverage	0 000	-0 002**	-0 002**	-0 003	-0 005*	-0 005*
	[0 939]	[0 032]	[0 026]	[0 182]	[0 069]	[0 070]
N	109	77	77	99	77	77
Adjusted R-squared	0 071	0 016	0 022	-0 041	0 012	0 002

Chapter III

Managerial Gambling Attitudes in U.S. Banking Acquisitions

"If you are in a hole, stop digging, it is often advised. But it can be difficult to follow such advice. We wish to 'gamble for resurrection' in the belief that our chosen strategy to support Manchester City...will finally pay off."

(Forbes (2009), p. 165)

3.1 Introduction

The purchase of lottery tickets is, from the perspective of classical economics, irrational. The desire to gamble, however, is deeply rooted in the human psyche (Kumar (2009)). The fascination with games of chance comes from biological, psychological, religious, and socioeconomic factors, which jointly determine the propensity to gamble (e.g., France (1902), Brenner (1983), Walker (1992))[8]. In this study, we investigate the extent to which managerial attitudes toward gambling influence investment decisions in the context of bank acquisitions.

Expected utility theory states that the decision maker chooses between risky or uncertain prospects by comparing their expected utility values, that is, the weighted sums obtained by adding the utility values of outcomes multiplied by their respective probabilities (Mongin (1997)). Although expected utility theory had been the dominant normative and descriptive model of decision making under uncertainty for several decades, it began to face more and more challenges from alternative models (see Kahneman and Tversky (1979), Tversky and Kahneman (1986, 1992), Machina (1987), Fishburn (1988), Camerer (1989)). Expected utility theory "does not provide an adequate description of individual choice," (Tversky and Kahneman (1992), p. 297) and in the past few decades, a number of economists and psychologists have accumulated a large body of experimental evidence that, when people make decisions under risk, they often depart from the predictions of expected utility (Tversky and Kahneman (1992)).

Among the so-called non-expected utility models, Kahneman and Tversky's

[8]Keno slips, the first recorded signs of a lottery, used in ancient China (second millennium B.C.) to help finance major government projects like the Great Wall of China (Shelley (1986)). Lottery, as an important tool of recreation and gambling, has also been a popular theme in film and television fiction. For example, the Russian writer Dostoevsky (himself a problem gambler) portrays in his novel *The Gambler* (1997) the psychological implications of gambling and how gambling can affect gamblers. He also associates gambling and the idea of "getting rich quick", suggesting that Russians may have a particular affinity for gambling.

(1979) prospect theory and Tversky and Kahneman's (1992) cumulative prospect theory are the most prominent (Barberis and Huang (2008)). Under prospect theory, when faced with choices involving simple two and three outcome lotteries, people behave as if maximizing an "S" shaped value function. Kahneman and Tversky (1979) assert the value function is i) defined on the deviation from the reference point, ii) generally concave for gains and commonly convex for losses, iii) steeper for losses than for gains, which implies that people are generally loss averse. Two main ingredients of (cumulative) prospect theory are reference dependence and probability weighting.

Reference dependence refers to the tendency of decision makers to frame outcomes into gains and losses relative to a reference point (Schneider and Spalt (2010)). "The simplest reference point is often zero, or the current level of wealth" (Forbes (2009), p. 166). Moreover, Baker, Pan, and Wurgler (2009) show that offer prices are biased toward the 52-week high. An offer's probability of acceptance discontinuously increases when the offer exceeds the 52-week high; conversely, bidder shareholders react increasingly negatively as the offer price is drawn upward toward that price. Merger waves occur when high recent returns on the stock market make it easier for bidders to offer the 52-week high. However, Kahneman and Tversky (1979) also point out that the reference point could shift, and alter the preference order for prospect. Specifically, due to incomplete adaptation to recent losses, individuals are likely to integrate their prior losses into the future prospects, and choose more adventurous choices, that is, gambling in loss space.

Probability weighting, refers to the overweighting of low-probability gains, which may contribute to the attractiveness of both insurance and gambling. Tversky and Kahneman (1992) develop a new version of prospect theory, using information about cumulative gains, or losses, an individual faces as moving away from some reference level of wealth and employing cumulative rather than separable decision weights. The cumulative prospect theory makes it possible "to discuss movements in probability even when individual probabilities themselves are hard to calculate with any precision" (Forbes (2009), p. 177).

Prospect theory (Kahneman and Tversky's (1979)), which predicts risk aversion over gains combined with risk seeking in towards losses, is further developed into a fourfold separation of attitudes to risk in cumulative prospect theory Tversky and Kahneman (1992). By examining 25 graduate students from Berkeley

and Stanford, Tversky and Kahneman (1992) find evidence of a distinctive fourfold pattern of risk attitudes[9], predicting that people facing a risky prospect will be: (1) risk seeking over low-probability gains, (2) risk averse over high-probability gains, (3) risk averse over low-probability losses, and (4) risk seeking over high-probability losses. "So for gambles involving significant probabilities (say 10%) the original statement of prospect theory seems to work fine. It is just at the tails of the distribution at near certainties, or near impossibilities, that an inversion of attitudes to risk appears to occur." (Forbes (2009), p. 177)

Higher gambling propensity can be directly translated into a probability weighting function that overweights small probability events (Tversky and Kahneman (1992)). According to cumulative prospect theory, investors exhibit a preference for skewness, shown in the weighting function by overweighing the tails of the distribution. A number of studies emphasize the potential role of gambling attitude in investment decisions (Shefrin and Statman (2000), Statman (2002), Polkovnichenko (2005), Barberis and Huang (2008), Boyer, Mitton, and Vorkink (2010)), and some papers analyze the implications of skewness-loving preferences (Kraus and Litzenberger (1976), Barberis and Huang (2008)). Barberis and Huang (2008), use these properties of cumulative prospect theory as a way of understanding some anomalies in financial markets and find that a security's own skewness can be priced and that a skewed security can earn a negative average excess return.

Shefrin and Statman (2000) develop a positive behavioral portfolio theory (BPT) and explore its implications for portfolio construction and security design. Optimal securities for BPT investors resemble combinations of bonds and lottery tickets. The authors explore the similarities between optimal BPT securities and real world securities such as bonds, stocks, and options and find that the BPT efficient frontier and the mean–variance efficient frontier, in general, do not coincide.

Statman (2002) points out that lottery playing and stock trading are negative-sum games—games that combine high risk with negative expected returns—and provides explanations for the reasons why people play/trade on them. First, all lottery players and stock traders are overconfident, thinking they are above average and likely to win, even in a negative-sum game. Second, lottery players and

[9] As asserted by Tversky and Kahneman (1992, p. 306), "the most distinctive implication of prospect theory is the fourfold pattern of risk attitudes."

stock traders aspire to move up in life, from the working class to the middle of the upper class.

Polkovnichenko (2005) presents experimental evidence in support of preferences with rank dependency.[10] Using Survey of Consumer Finances data, the author documents two widespread patterns that are inconsistent with expected utility: (i) Many households simultaneously invest in well-diversified funds and in poorly diversified portfolios of stocks, and (ii) some households with substantial savings do not invest anything in equities. The portfolio choice models with rank-dependent preferences are quantitatively consistent with the observed diversification.

Barberis and Huang (2008) focus on the probability weighting component of Tversky and Kahneman's (1992) cumulative prospect theory. In contrast to the prediction of a standard expected utility model, the authors find that a security's own skewness can be priced: A positively skewed security can be overpriced and can earn a negative average excess return.

Boyer, Mitton, and Vorkink (2010) test the prediction that stocks with high idiosyncratic skewness should have low expected returns and find that expected idiosyncratic skewness and returns are negatively correlated. Specifically, the Fama–French alpha of a low-expected-skewness quintile exceeds the alpha of a high-expected-skewness quintile by 1.00% per month. Furthermore, the coefficients on expected skewness in Fama–MacBeth cross-sectional regressions are negative and significant. Boyer, Mitton, and Vorkink (2010) also find that idiosyncratic volatility is a strong predictor of idiosyncratic skewness, and both idiosyncratic volatility and skewness having significant explanatory power for expected returns, independent of the other.

Kumar (2009), shows that the propensity to gamble and investment decisions are correlated. At the aggregate level, individual investors prefer stocks with lottery features, and, like lottery demand, the demand for lottery-type stocks increases during economic downturns. In the author's cross-sectional analysis, socioeconomic factors that induce greater expenditure in lotteries are associated with greater investment in lottery-type stocks; that is, state lotteries and lottery-type stocks attract very similar socioeconomic clienteles.

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[10] Rank dependency theory is designed to explain the behavior observed in the Allais paradox, which is a choice problem designed by Allais (1953) to show an inconsistency of actual observed choices with the predictions of expected utility theory, as well as for the observation that many people both purchase lottery tickets (implying risk-loving preferences) and insure against losses (implying risk aversion)

Schneider and Spalt (2010) analyze takeover announcements for public U.S. targets from 1986 to 2008 and find that gambling attitudes matter in takeover decisions. Specifically, the offer price premium is higher in acquisitions where the target's stock has characteristics similar to those of lottery tickets (high skewness, high volatility, and low price). The authors also find that, in these lottery-type acquisitions, both bidder announcement returns and expected synergies from the deal are lower while target returns are higher.

This paper examines whether probability weighting and, more generally, gambling attitudes have important implications in the context of bank merger decisions. Specifically, we explore their impact on the price paid in bank acquisitions and the market's reaction to bank takeover bids. Since probability weighting captures the tendency of managers to overweight small probability events and to underweight medium to large probability events, we conjecture that managers of acquiring banks exhibiting gambling attitudes and a preference for positively skewed lotteries will tend to the offer higher price premiums (i.e., overvalue small probabilities of large future returns) for targets that have characteristics similar to those of lottery tickets. This tendency is expected to be pronounced for targets with a highly skewed distribution of future returns. As a result, this is expected to have a negative impact on the bidder's announcement returns and, all else being equal, increase announcement returns for the target. Moreover, since managers subject to probability weighting perceive the upside return potential of the target to be higher than it actually is, synergies should, on average and all else being equal, be lower in deals for which gambling attitudes matter. Following Schneider and Spalt (2010), we develop a proxy for the attractiveness of a specific target firm as a gambling object and provide empirical evidence for the above predictions.

The house money effect could also motivate gambling. Thaler and Johnson (1990) first introduced the house money effect by considering how prior outcomes are combined with the potential payoffs offered by current choices. They assert that agents are inclined to take larger risks when prior outcomes have been positive. The evidence from Thaler and Johnson (1990) provides important insights into how individuals make sequential decisions. Agents that exhibit the house money effect consider large or unexpected wealth gains to be distinct from the rest of their wealth, and are thus more willing to gamble with such gains than they ordinarily would be. Barberis, Huang and Santos (2001) develop a model based on "loss aversion" of

Kahneman and Tversky (1979) and the "house money effect" of Thaler and Johnson (1990), and show that individuals who have experienced recent gains are less averse to risky gambles.

Futhermore, Thaler and Johnson argue that the house money effect is generally consistent with prospect theory (Kahneman and Tversky, 1979) if agents apply "hedonic editing"[11] to the gambles they face. What distinguishes the house money effect is that it focuses primarily on dynamic decision making in which people have to choose how to frame prior losses vs. gains and how such choices influence future risk-taking. It emphasizes behavior shifting towards risk. That is, increasing risk-taking after prior gains (Liu, Tcai, Wang and Zhu (2006)). So far, there are a number of laboratory based studies (Battalio and Jiranyakul (1990), Gertner (1993), Keasey and Moon (1996), Ackert, Charupat, Church and Deaves (2006), and Post, Van den Assem, Baltussen, and Thaler (2008)), and also a few empirical studies for the house money effect (Liu, Tcai, Wang and Zhu (2006), Brunnermeier and Nagel (2008), Calvet, Campbell, and Sodini (2009), Gamble, K. J., B. Johnson and D. Kim, 2009). To the best of our knowledge, this study is the first to empirically address the house money effect in the context of bank managerial acquisition choices by investigating on the relation of bidder banks' risk seeking behavior to their prior performance (stock market performance and net income).

Essay II is organized as follows. Section II develops our hypotheses based on related literature. Section III describes the methodology and data. Section IV reports the empirical results. Section V summarizes our findings and offers conclusions.

3.2 Hypothesis Development

This paper's main conjecture is that gambling preferences are relevant for bank acquisitions. This perspective has several testable implications for lottery acquisitions that involve targets whose stocks have the salient features of lotteries. The first is associated with the relation between lottery acquisitions and offer price premiums, synergies, and announcement returns. In an acquisition, managers subject to probability weighting overvalue targets that look like attractive bets, and thus may be willing, all else being equal, to pay a higher offer price premium (the price paid for

[11] Specifically, "after a gain, subsequent losses that are smaller than the original gain can be integrated with the prior gain, mitigating the influence of loss aversion and facilitating risk-seeking" (Thaler and Johnson (1990), p657)

the target's stock relative to its pre-announcement value) in lottery acquisitions (see H1 in Appendix A).

Second, managers are more likely to acquire a lottery-type target for the same price than an otherwise identical non–lottery-type target, despite the fact that it has a lower expected level of synergies than the latter (see H2 in Appendix A). If synergies are expected to be significantly higher in lottery-type acquisitions, a higher offer price premium may not be indicative of gambling behavior. However, if Hypotheses 1 and 2 gain support in the data, then managers may be willing to pay a higher premium in lottery acquisitions in spite of the lower synergies. Evidence consistent with Hypotheses 1 and 2 would provide strong support for our main gambling conjecture.

Third, assuming that the market is efficient, the announcement return for the acquiring bank is expected to be lower in lottery acquisitions (see H3 in Appendix A). Because overpayment is a pure wealth transfer to target shareholders, target announcement returns are expected to be higher. At the same time, smaller synergies for lottery acquisition correspond to lower target announcement returns, since the benefits that can be split between the bidder and the target are smaller. Whether target announcement returns are higher or lower in lottery acquisitions is thus an open question. If we consider the offer price premium paid by the bidders due to their gambling attitude, higher announcement returns for target shareholders despite possibly lower synergies for lottery acquisitions would provide strong evidence in support of the gambling hypothesis (see H4 in Appendix A).

Besides the conjectures about bid premiums, synergies, and announcement returns jointly, we develop another set of hypotheses that focuses on some unique implications of our gambling conjecture. Examining the effects of broad macroeconomic indicators, lottery studies demonstrate that people find the tiny probability of a large gain more attractive when economic opportunities are not very bright. Evidence for this has been provided in the context of state lotteries[12] (Brenner and Brenner (1990), Mikesell (1994)) and in the context of the behavior of individual investors, who invest more in lottery-type stocks in bad economic conditions (Kumar (2009), Schneider and Spalt (2010)). Since economic downturns limit the growth

[12] During economic downturns, people are attracted more toward various forms of gambling, including state lotteries (Mikesell (1994)) During the Great Depression, the popularity of lottery playing and gambling increased dramatically in the United States (Brenner and Brenner (1990)). Sweden experienced a similar phenomenon: Gambling there became extremely popular and gambling activities such as soccer pools were made legal during the Great Depression (Tec (1964)).

opportunities available through typical economic activities, gambling in acquisitions is likely to become more attractive (see H5 in Appendix A).

Furthermore, "a person who has not made peace with his losses is likely to accept gambles that would be unacceptable to him otherwise" (Kahneman and Tversky (1979), p. 287). The propensity to gamble is likely to increase when a manager is in the loss space, which is a direct implication of the shape of the prospect theory value function. Kahneman and Tversky (1979) point out peoples' risk-seeking attitude in choices involving sure losses; that is, the willingness to gamble increases strongly if the alternative is a sure loss. We hypothesize that gambling in the loss space is also relevant for bank takeovers. If a bank has recently underperformed (e.g., low stock returns in the recent past, large difference with the 52-week high, or a negative net income last year), its managers may deem themselves to be in the loss space and are likely to be more eager to gamble on a long shot (see H6a in Appendix A).

Finally, we also investigate the influence of house money effect, originally proposed by Thaler and Johnson (1990). Specifically, if bank managers consider prior stock market earnings as windfall gains, the house money effect hypothesis predicts that they may lead them to increased risk-taking (see H6b in Appendix A).

3.3 Methodology

3.3.1 Dataset Construction

The sample data on U.S. bank takeover bids are obtained from the Thomson ONE Banker Database (SDC) for the period January 1985 to December 2006. The data originally included 1369 complete deals, of which both the bidders' and the target firms' stocks were traded on the New York Stock Exchange, American Stock Exchange, or NASDAQ, with Center for Research in Security Prices (CRSP) data available around takeover announcements. We compute a lottery index, the LIDX, described in detail below, for the targets of 1059 of these deals and report them in Table 3.1. Following Schneider and Spalt (2010), the lottery characteristics of the targets in bank acquisitions are measured by the LIDX. This index is used in the analysis as the main explanatory variable.[13]

[13] This index is in the spirit of Kumar (2009), who developed a similar index in his analysis of the gambling behavior of retail investors

The LIDX is designed to capture the similarity of the salient features of lottery tickets—low price, high idiosyncratic volatility, and expected idiosyncratic skewness—with those of the target's stock. The motivation behind these three features of the LIDX is that attractive gambles are typically cheap (i.e., low-price ticket), have risky payoffs (i.e., have a high variance), and, most importantly, have a very low probability of a large payoff (i.e., have high skewness). Hence, the attractiveness of the target as a gamble is measured by an increase in the LIDX. The idiosyncratic skewness, EISKEW, captures the asymmetry of the probability distribution of the target's stock return. Specifically, a positive EISKEW means the return of the target is positively skewed. The idiosyncratic volatility, IVOLA, measures the variation of the target's stock return after excluding systematic risks and analogous factor loadings. Following Baker, Pan, and Wurgler (2009), we require that the bidder offers to purchase at least 85% of the target firm's shares. After we exclude deals with missing offer prices, missing transaction values, a value smaller than $1million, or missing bidder/target financial dates, 100 offers remain.

To measure idiosyncratic skewness, we follow Harvey and Siddique (2000) and Kumar (2009) and decompose total skewness into its idiosyncratic and systematic components. Specifically, EISKEW is a scaled measure of the third moment of the residual obtained by fitting the market model, the excess market return being an explanatory variable, to the daily stock returns time series over a 1-year period ending in month t - 1. IVOLA is the standard deviation of the regression residual obtained by fitting a Fama–French (1993) three-factor model to the daily stock returns time series over a 3-year period ending in month t - *2* for an announcement in month t. Stock prices are obtained from the CRSP database. Fama–French factors are obtained through the Fama–French factor installer of the Eventus 9 software.

The price is also used as one of the defining characteristics of lottery-type stocks, since the price is likely to be an important characteristic of stocks that may be perceived as lotteries (Kumar (2009)). Stock price refers to the price on the last trading day in month t - 1 before the takeover announcement in month t. For our original sample, we assume that stocks in the lowest kth stock price percentile, the highest kth idiosyncratic volatility percentile, and the highest kth idiosyncratic skewness percentile are likely to be perceived as lottery-type stocks. All three sorts are carried out independently. We choose k = 20, following Schneider and Spalt

(2010), where 20 indicates the group with the lowest price and the highest volatility and skewness The target price is used as one of the defining characteristics of lottery-type stocks because investors with gambling attitudes are seeking cheap bets and are thus attracted to low-price stocks (Kumar, 2009)

To construct the LIDX, which measures how much a target stock shares salient lottery (attractive gamble) characteristics, stocks are assigned to vigintiles (semi-deciles) by price, idiosyncratic volatility, and expected idiosyncratic skewness The price, volatility, and skewness vigintile assignments are added for each target to produce a score ranging from 3 to 60, which is then scaled to range from 0 to 1, using (Score – 3)/(60 – 3) As in Kumar (2009), we use a similar measure to define lottery-type and non–lottery-type stocks and to label a target with a high LIDX value, that is, above the median LIDX value, as a lottery type Hence, we call a transaction involving a lottery-type target a lottery acquisition Table 3 1 reports the number of acquisitions by year and the lottery characteristics of targets, as measured by the LIDX The year 2000 witnessed the highest percentage of lottery-type acquisitions, 603%, whereas 1985 had the lowest percentage of lottery-type acquisitions, 109%

In addition to our main explanatory variable, *LIDX* and its components, we control for variables identified in the literature in all regressions Specifically, following Baker, Pan, and Wurgler (2009), we control for the return on assets (ROA), defined as net income over total assets (from Compustat), market capitalization, defined as price (from CRSP) times shares outstanding (from CRSP), and the market-to-book ratio, defined as market capitalization divided by book equity All these variables are calculated for bidders and targets and are based on the last fiscal year-end before the announcement Following Moeller, Schlingemann, and Stulz (2004) and Schneider and Spalt (2010), we include additional control variables, dummy variables indicating payments through stock only, competed deals (with more than one bidder), geographic diversification, and activity diversification We also include the relative sizes of transaction value and bidder's market capitalization in all regressions We obtain the aggregate market-level sentiment index data from Jeffrey Wurgler's website,[14] the Chicago Fed National Activity Index (CFNAI), and the 52-week highest price from the CRSP (to construct DIFF52)

[14] http //pages stern nyu edu/~jwurgler/

The dependent variables we use include the offer price premium, bidder and target cumulative abnormal returns, and synergy. The offer price premium is reported by the SDC and is defined as the bid price over the target's stock price four weeks before the takeover announcement minus 100%. We calculate bidder and target cumulative abnormal returns over a three-day window around the announcement, using market model estimates based on daily data with an estimation period over days [-230, -31]. Synergies are estimated as a weighted average (by market capitalization) of target and bidder percentage returns, following the procedure in Bradley, Desai, and Kim (1988). Appendix B provides an overview of all the variables used in our analysis and their definitions.

3.3.2 Summary Statistics

Table 3.2 displays descriptive statistics for the main variables used in our analysis. We report the mean, median, standard deviation, and several percentiles of interest, as well as the number of observations for each variable, which varies due to data availability. The median offer price premium is 10.53%. Median cumulative abnormal announcement returns (ACAR) for bidders from day -1 to day +1 (ACAR[-1,+1]) is 0.2%. The median target announcement return (TCAR[-1,+1]) is 3.8%. Synergies, the combined change of bidder and target returns, (Synergy[-1,+1]) are 0.76%, so offers are, on average, expected to create value. The median bidder has a market capitalization of $364.57 million, a market-to-book ratio of 3.11, and an ROA of 1.18%. The median target, considerably smaller than the bidder, has a market capitalization of $79.81 million. Since we are looking only at public targets, these are, on average, sizable firms. For the mean offer, Table 3.2 shows that the proposed deal value is 27.25% of the bidder's market capitalization, which illustrates that these transactions are important financial decisions for bidders. With 1.60, the average market-to-book ratio of targets is smaller than the market-to-book ratio of bidders, 9.31, indicating that acquiring banks are relatively overvalued. The performance of targets in terms of ROA is 1.03% and thus consistent with the view that underperforming firms are more likely to become targets. If we consider deal characteristics, Table 3.2 shows that 38% of the bids offer stock only, while 1.1% of the deals have more than one bidder. For 25% of the offers, the bidder and the target come from different states; for 17% of the offers, the partners have Standard Industrial Classification (SIC) codes where the first three digits are different.

3.4 Empirical Results

This section presents our main empirical results. We largely follow the prior literature (Moeller, Schlingemann, and Stulz (2004), Baker, Pan, and Wurgler (2009), Schneider and Spalt (2010)) in our regressions and control variables. Specifically, we regress the offer price premium, synergy, and announcement returns on our lottery measures (*LIDX, EISKEW, IVOLA*, and *Price*) and a set of bidder and target financials suggested by Baker, Pan, and Wurgler (2009) and Schneider and Spalt (2010), including bidder (target) ROA (*ROA)*, acquirer (target) market-to-book ratio (*MB*), bidder (target) market value (*MCAP*), and some deal characteristics such as relative size, method of payment (*Stock*), competed deals with multiple bidders (*Competed*), and activity/geographic diversification (*Activity Diversification*, *Geo Diversification*). We use ordinary least squares (OLS) in all regressions.

Our main lottery variable is *LIDX*, where a higher index value indicates greater attractiveness as a gamble. Although we do not expect any single measure to capture the attractiveness of a target as a gamble as well as the LIDX, for completeness we also present the results of using the components of the index, namely, idiosyncratic skewness, idiosyncratic volatility, and the price of the target's stock prior to the announcement.

3.4.1 Offer Price Premiums

As discussed earlier, we hypothesize that the offer price premium will be higher in lottery acquisitions (H1). We find strong support for this hypothesis when we regress the offer price premium on *LIDX* (Table 3.3). We also find that the individual components of the LIDX are positively related to the offer price premium, as expected: The offer price premium increases with skewness, *EISKEW*, and volatility, *IVOLA*, and decreases with target stock price. The coefficients of *LIDX* are 39.641 (column (1) of Table 3.3) and 37.56 (column (5) of Table 3.3), both highly statistically significant. A change of one standard deviation in *LIDX* increases the offer price premium by 31.85% (= 0.19 × 37.560/22.4).[15] The average market capitalization of targets is $937.69 million, so a 31.85% higher premium represents an

[15] Since 0.19 is the standard deviation of the LIDX (Table II), 37.560 is the coefficient of the LIDX (Table III), and the average offer price premium is 22.44% (Table II), a change of one standard deviation in the LIDX increases the offer price premium by 31.85%.

additional $66.90 million (= $937.69 million × 31.85% × 22.4%)[16] in consideration paid to target shareholders for the average transaction. For all 1059 completed deals, this represents a total increase of $705 billion in the price paid to targets due to gambling attitudes. Hence, the effects we document are economically large.

For the control variables, we do not find that strongly consistent relations exist. There is a positive relation between bidder performance, measured by ROA, and the premium paid, but it becomes tenuous when we add more control variables into the regressions. The relative size, measured by the transaction value divided by the bidder market value, competed deals, and activity diversification also have a slightly positive influence on the bid premium.

3.4.2 Synergies

Our second hypothesis is that, on average, synergies will be lower in lottery acquisitions. Following Bradley, Desai, and Kim (1988), we measure synergies as the sum of target and bidder three-day announcement returns weighted by the market capitalizations of the target and bidder, respectively. Table 3.4 shows that although there is a positive relation between synergy and *LIDX*, there is no significant and consistent relation between synergy and the components of the LIDX.

3.4.3 Bidder and Target Announcement Returns

Since lottery acquisitions pay higher offer price premiums, we expect negative bidder returns around the announcement date (H3). Panel A of Table 3.5 presents the results concerning H3. When we regress three-day announcement returns for the acquiring firm on the LIDX, we find no significant effects of the LIDX or it components.

Because of the significant positive effects of the LIDX on offer price premiums and unclear effects on synergies, we expect lottery acquisitions to have a positive impact on target announcement returns. Panel B of Table 3.5 reports the results for targets. Three-day announcement returns are positively related to the lottery index and its constituents, high skewness and high volatility, and negatively to the price of the target. These results are consistent in both regression groups. A

[16] The average market value of the target firm is $937.69 million and the average offer price premium is 22.44% (see Table II), so a 31.85% increase in the premium will lead to an additional $66 90 million increase in the target firm's market value.

change of one standard deviation in the LIDX increases target announcement returns by 79.86% (= 0.377 × 0.19/8.97%),[17] or about $67.17 million (= $937.69 million × 0.377 × 0.19).[18] This is consistent with bidders overpaying sufficiently for targets that look like attractive gambles to compensate for the small gains from synergies.

3.4.4 Robustness Checks

Our empirical results provide strong evidence suggesting that gambling attitudes influence deal pricing in lottery acquisitions. This section presents a battery of robustness checks for our regressions with the offer price premium, synergies, and announcement returns as dependent variables. Additional tests are conducted to ensure that the stock-level regression estimates are robust to microstructure issues, or economic downturns. These results are reported in Table 3.6. The main results concerning the coefficient of *LIDX* from column (5) in Tables 3.3 to 3.5 are shown at the top of each panel of Table 3.6 as a baseline. For conciseness, we show only the results for our main index, the LIDX.[19]

In Table 3.6, we run our regressions on a number of subsamples. First, we divide the sample into large and small bidders, since there is a size effect in acquisition announcement returns and the effect is robust to firm and deal characteristics (Moeller, Schlingemann, and Stulz (2004)). We also split our sample into large and small targets to determine if our results are driven by a particular subsample of targets. Furthermore, we use the sentiment index of Baker and Wurgler (2006) to see if our regressions are picking up effects related to sentiment, that is, market effects, rather than effects from managerial preferences. Table 3.6 presents the lottery acquisition effects in all subsamples.

We find that the effects for lottery acquisitions are more consistent with our hypotheses when the bidder is bigger. Moeller, Schlingemann, and Stulz (2004) provide evidence that managers of large firms pay more for acquisitions and that the premium paid increases with firm size after controlling for firm and deal characteristics. The authors claim that it is consistent with hubris being more of a

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[17] Since 0.19 is the standard deviation of the LIDX (Table II), the coefficient of the LIDX is 0.377 (Table V, Panel B), and the three-day average cumulative abnormal return of the target firms is 8.97% (Table II), a change of one standard deviation in the LIDX increases target announcement returns by 79.86%.

[18] Since 0.19 is the standard deviation of the LIDX (Table II), the coefficient of the LIDX is 0.377 (Table V, Panel B), and the average market value of the target firm is $937.69 million (Table II), a change of one standard deviation in the LIDX increases the target firm's market value by $67.17 million

[19] The results are similar when we conduct the same regressions on the other two components of the *LIDX*, namely, *EISKEW* and *IVOLA*

problem for large firms. Hannan and Pilloff (2007) find that larger banks are less likely to be acquired, consistent with the hypothesis that post-merger integration is more difficult for relatively large targets. We also find evidence that the offer price premium and target announcement return for lottery acquisitions are higher when the target is smaller.

Our results concerning the market effects are consistent with the traditional view that investor sentiment affects merger financing decisions, as in Shleifer and Vishny (2003), and lottery stocks become more attractive to optimists and speculators when sentiment is estimated to be high (Baker and Wurgler (2006)). Specifically, we find that bidding banks pay higher premiums and synergy is lower when sentiment is high. The target announcement returns are also slightly higher in high-sentiment periods.

The existing evidence from lottery ticket sales and retail investment in lottery stocks (Brenner and Brenner (1990), Mikesell (1994), Kumar (2009)) shows that if business opportunities deteriorate in economic downturns, gambling is likely to become more attractive. Following Schneider and Spalt (2010), we use the CFNAI to measure the state of economic conditions. This is a monthly index designed to gauge overall economic activity and related inflationary pressure by combining information in 85 existing monthly indicators of U.S. economic activity. A zero value for the index indicates that the national economy is expanding at its historical trend rate of growth, negative values indicate below-average growth, and positive values indicate above-average growth. In columns (8) and (9) of Table 3.6, we split our sample by positive and negative CFNAI values 1 month prior to the announcement. The evidence shows that during economic downturns, bidders pay higher premiums for targets, consistent with the hypothesis that bad economic conditions make gambling relatively more attractive.

3.4.5 Gambling in the Loss (Win) Space?

Prospect theory predicts that the willingness to accept gambles increases in the loss space. Kahneman and Tversky (1979) illustrate that, based on observation, most people would prefer a sure $3000 over an 80% chance to win $4000 and nothing otherwise, while preferring a gamble involving a 20% chance to pay nothing (and thus to break even) and an 80% chance of losing $4000 over a sure loss of $3000. The observed preferences can be described by a value function that is concave in the gain

space and convex in the loss space of the value function, that is, individuals are risk seeking when they face losses and risk averse when they face gains. We extend the one-stage reasoning in this simple experiment to the more complex two-stage situation of bank takeovers where managers find gambling more appealing when they are in the loss space and a successful bet would be considered to provide a chance to get out of it.

On the other hand, the house money effect conjecture predicts that managers may become more risk seeking when they are in the win space. That is, gambling emerges as a more attractive option when the pain from the suffering of an unsuccessful bet could be mitigated by prior gains.

Table 3.7 documents a positive association between prior market performance (valuation) and banking mergers, and provides evidence that inefficient stock market overvaluation is an important driver of U.S. bank mergers, which is consistent with the house money effect. Specifically, Panels A and B of Table 3.7 show the how different relative valuation measures before the announcements, the price-to-book ratio *P/B (2 years before)* and the price-to-intrinsic income value ratio *P/V,* are related to the method of payment. The price-to-intrinsic income value ratio (*P/V)* is estimated using a three-period forecast horizon residual income model and perpetual residual income model, respectively. The empirical results show that bidders are more highly valued relative to their targets in the full sample, especially among deals associated with equity offers. In addition, the evidence reveals that (i) highly valued bidders are more likely to use stock than cash, (ii) are willing to pay more relative to the target market price, and (iii) earn lower announcement-period returns.

Panel C of Table 3.7 further reports how the bidder performances before the merger announcements are related to the method of payment. For the entire sample, compared with the targets, the bidders have significantly higher stock prices (smaller difference between stock price and 52-week high (*DIFF52*)), higher net income (*NI*) and higher return-on-assets (*ROA*) in the last fiscal year. These features become more salient in the subsample with stock payment. Specifically, the average net income of all the bidders is $196.77 million, significantly higher than that of all the targets, which is $63.31 million. And the average return-on-assets of all the bidders is 1.21%, significantly larger than that of all the targets, which is 1.05%.

Overall, these results indicate that after prior gains, bidders are likely to increase their risk taking investment, especially by playing with their better-performed (overvalued) stocks to acquire other banks.

To further test the role of prior losses/gains, we need to identify the conditions that managers may either feel the desire to enter a gamble to break even a prior loss or take more risks in response to prior gains. First, we conjecture that the more (less) a bidder's stock price is below its 52-week high, Large Diff52 (Small Diff52), the more likely the manager feels to be in the loss (win) space. Second, we use bidder's stock returns to identify when a manager will feel he is in a loss (win) space. Specifically, a manager will feel to be in the loss (win) space if the firm's stock return has been particularly low (high) over the last year, Low RET52 (High RET52). Third, we use an accounting measure and conjecture that being in the loss (win) space is more likely if the firm has reported negative (positive) net income in the previous fiscal year, Positive NI12 (Negative NI12).

Table 3.8 presents the results in relation to gambling in the loss space and the house money effect in the win space. Interestingly, we find that bank managers tend to pay higher premiums for lottery-type targets if the bidder's stock price is near its 52-week high (Small Diff52), if the bank's stock return has been particularly high over the last year (High RET52), or if the bank reported positive net income in the previous fiscal year (Positive NI12). These results are consistent with the house money effect, which predicts risk taking behavior (i.e., acquiring targets with lottery characteristics) after prior gains. However, the results do not seem to support gambling behavior in the loss space. With respect to target announcement returns, the results indicate that targets realize greater abnormal returns when bidders' stock prices are near their 52 week high, or experienced high 12 month cumulative abnormal returns. Finally, the evidence confirms that acquiring targets with lottery attributes do not result in any significant synergy gains.

In sum, we find that banks perform well before they conduct mergers, especially bidders using stock as a method of payment. The evidence concerning the managers' gambling attitude appears to be stronger when the acquirer has performed well in the past, which is consistent with the prediction of the house money effect.

3.5 Conclusion

Many financial phenomena have been discovered by researchers that are hard to understand in the context of the expected utility paradigm. This article is particularly interested in shedding light on the conjecture that gambling attitudes among acquiring bank managers influence their takeover decisions, and what is driving the managers to gamble. We pay special attention to the probability weighting component of cumulative prospect theory, which induces a preference for lottery-like skewed payoffs that may have tangible effects on deal pricing and market reactions to merger bids.

Following Schneider and Spalt (2010), we form an index measuring how much a bank target stock shares salient characteristics of attractive gambles (i.e., high skewness and volatility and low price) and show that offer price premiums and target announcement returns are higher in bank takeover transactions involving targets with these gambling features. We also find evidence in support of the view that synergies are lower in lottery-type acquisitions. Furthermore, we find that target announcement returns are much higher in lottery-type acquisitions. By performing several robustness checks, we find that the managerial gambling attitude is more significant when the bidder size is above the median (which provides some evidence for the hubris hypothesis), the target size is below the median (consistent with the post-acquisition integration hypothesis), investor sentiment is above the median (consistent with the view that sentiment influences a firm's financial decision), or the CFNAI is negative (consistent with the assertion that gambling becomes more attractive during economic downturns).

The evidence also shows that house money plays an important role in motivating banks to conduct acquisitions. Specifically, we find that the house money effect enhances managerial risk-seeking by encouraging top decision makers to enter into a merger, by paying a higher premium, when the bidding firm has just experienced higher market performance or earned higher net income in the previous year.

Overall, our evidence supports the conjecture that managerial gambling attitudes matter in bank merger decisions. By examining the probability weighting effect in bank acquisitions, a key feature of prospect theory, our main result shows that the value destruction to bidder bank shareholders is prominent when bidders pursue lottery-type acquisitions fueled by the house money effect.

Appendix A

Hypotheses

H1: Offer price premium: The offer price premium is higher if the target is an attractive gambling object, that is, if the target stock's characteristics more closely resemble salient characteristics of lotteries.

H2: Synergies: Synergies are expected to be lower in lottery acquisitions.

H3: ACARs: Bidder announcement returns are expected to be lower in lottery acquisitions.

H4: TCARs: Target announcement returns are expected to be higher in lottery acquisitions.

H5: Gambling propensity–economic downturns: During economic downturns, the effects of the target firm's lottery characteristics on the offer price premium, synergies, and announcement returns are more pronounced.

H6a: Gambling in the loss space: The effects of the lottery characteristics of targets on the offer price premium, announcement returns, and synergies should be more pronounced for acquiring banks that have recently underperformed.

H6b: Gambling with the house money: The effects of the lottery characteristics of targets on the offer price premium, announcement returns, and synergies should be more pronounced for acquiring banks that have recently performed well either on the stock market or fundamentally.

Appendix B:
Variable Definitions and Sources

Variable Name	Description	Source
Lottery Variables		
LIDX	Stocks are assigned to vigintiles (semi-deciles) by price, idiosyncratic volatility, and expected idiosyncratic skewness (where 20 represents the group with the lowest price and highest volatility and skewness) The price, volatility, and skewness vigintile assignments are added for each target to produce a score ranging from 3 to 60, which is then scaled to range from 0 to 1 using (Score-3)/(60-3)	CRSP
IVOLA	Idiosyncratic volatility (standard deviation) of the regression residual using the Fama–French (1993) three-factor model Residuals are estimated using daily data over a 3-year period prior ending in month t - 2 for an announcement in month t	CRSP
EISKEW	Idiosyncratic skewness adopts the scaled measure of the third moment of the residual obtained by fitting the market model with daily stock returns over a 1-year period ending in month $t - 1$	CRSP
Target Price	The share price of the target firm on the last trading day in month t - 1 before the takeover announcement in month t	CRSP
Bidder Characteristics		
ROA	Bidder (target) firm *ROA* (= net income/total assets) from the last fiscal year before the takeover announcement	Compustat
MB	The ratio of the book value of equity (= stockholder equity - deferred taxes and investment tax credit - redemption value of preferred stock) to the market value of equity (*MCAP*) the last fiscal year-end before the takeover announcement for the bidder (target) firm	CRSP, Compustat
MCAP	Price × Shares outstanding (in millions of dollars) the last fiscal year-end before the takeover announcement for the bidder (target) firm	CRSP
Relative Size	The transaction value over the bidder's market capitalization the last fiscal year-end before the takeover announcement	SDC, CRSP
Deal Characteristics		
Premium	The offer price premium is defined as the bid price over the target's stock price four weeks before the takeover announcement minus 100%	SDC
A(T)CAR[-1,+1]	The cumulative abnormal returns for the bidder (target) firm using the market model, where market model parameters are estimated over days (-274, -20)	CRSP
$ACAR[-1 +1]	The cumulative abnormal dollar returns for the bidder firm, defined as ACAR[-1,+1] × BidderMCAP[-2] - Toehold × TCAR[-1,+1] × TargetMCAP[-2]	SDC, CRSP
$TCAR[-1,+1]	The cumulative abnormal dollar returns for the target firm are defined as TCAR[-1,+1] × TargetMCAP[-2]	CRSP

Synergy[-1,+1]	The synergies are calculated as ($ACAR[-1,+1] + $TCAR[-1,+1]) / (BidderMCAP[-2] + (1- Toehold) × TargetMCAP[-2])	SDC, CRSP
$Synergy[-1,+1]	The dollar synergies are $ACAR[-1,+1] + $TCAR[-1,+1]	SDC, CRSP
Toehold	The percentage of shares held by the bidder on the takeover announcement date	SDC
Stock	One for mergers financed with stock only, and zero for cash only	SDC
Competed	One for mergers with more than one bidder, and zero otherwise	SDC
Geo Diversification	One for mergers in which the bidder and target are located in the same state, and zero otherwise	SDC
Activity Diversification	One for mergers in which both partners have SIC codes where the first three digits are the same, and zero otherwise	SDC
Gambling propensity		
CFNAI	Weighted average of 85 existing monthly indicators of U S economic activity It is constructed to have an average value of zero and a standard deviation of one A positive index corresponds to above-trend growth, and a negative index corresponds to below-trend growth	Chicago Fed
Variables indicating loss space		
DIFF52	The difference of the bidder's current stock price from the 52-week high, scaled by the current stock price The bidder's current stock price is the stock price on the last trading day of month t - 2 prior to the takeover announcement month t The 52-week high is defined as the highest share price during the 12 months ending on the last trading day of month $t-2$	CRSP

Table 3.1
Sample Statistics

This table reports the number of acquisitions by year and the lottery characteristics of targets in those acquisitions as measured by the lottery index LIDX The LIDX measures the similarity of the target stock's characteristics with salient features of lottery tickets (low price, high idiosyncratic volatility, and expected idiosyncratic skewness) The LIDX increases with the attractiveness of the target as a gamble We form high- and low-LIDX groups by splitting the pooled sample at the median LIDX value See Appendix B for a definition of the LIDX

	Full Sample	High LIDX	Low LIDX	% High LIDX
1985	7	1	6	14 29%
1986	22	8	14	36 36%
1987	19	10	9	52 63%
1988	23	15	8	65 22%
1989	30	19	11	63 33%
1990	36	18	18	50 00%
1991	34	22	12	64 71%
1992	43	25	18	58 14%
1993	45	24	21	53 33%
1994	71	37	34	52 11%
1995	93	46	47	49 46%
1996	132	62	70	46 97%
1997	103	36	67	34 95%
1998	108	42	66	38 89%
1999	101	57	44	56 44%
2000	102	70	32	68 63%
2001	43	18	25	41 86%
2002	11	7	4	63 64%
2003	14	4	10	28 57%
2004	11	3	8	27 27%
2005	3	2	1	66 67%
2006	8	2	6	25 00%
Total	1059	528	531	49 86%

TABLE 3.2
Summary Statistics

This table displays descriptive statistics for the main variables used in our analysis The lottery index *LIDX* measures the similarity of the characteristics of the target's stock with salient features of attractive gambles *LIDX* increases with the attractiveness of the target as a gamble Its constituents are the price of the target's stock (*Price*), expected idiosyncratic skewness (*EISKEW*), and idiosyncratic volatility (*IVOLA*), all measured at the end of the second month prior to the month of the announcement Here, *ROA* is the bidder (target) firm *ROA* from the last fiscal year before the takeover announcement, *MB* is the bidder (target) firm market-to-book ratio the last fiscal year-end before the takeover announcement, and *MCAP* is the bidder (target) firm market capitalization the last fiscal year-end before the takeover announcement The relative size is the transaction value over the bidder's market capitalization the last fiscal year-end before the takeover announcement, *Premium* is the offer price premium, defined as the bid price over the target's stock price four weeks before the takeover announcement minus one, A(T)CAR[-1,+1] is bidder (target) announcement returns computed using the [-1,+1] event window and a market model estimated over days [-230,-31], and synergy [-1,+1] is defined as the weighted sum (by market capitalization) of the bidder and target cumulative abnormal announcement returns, following Bradley, Desai, and Kim (1988) Here, Stock is a dummy variable indicating that a deal is financed with stock only, and Competed is a dummy variable indicating deals with more than one bidder *CFNAI* is the Chicago Fed National Activity Index Finally, *RET12* is the cumulative return of the bidder's stock calculated over months t - 13 to t - 2 for a takeover announcement in month t, *DIFF52* is the ratio of the bidder's stock price at the end of month t - 2 and the 52-week high over months t - 13 to t - 2 minus one, and *Net Income* is the net income of the last fiscal year before the takeover announcement See Appendix B for a detailed overview of variable definitions

Variable	Mean	SD	Median	Min	25th %ile	75th %ile	Max	N
Lottery Variables								
LIDX	0 52	0 19	0 52	0 00	0 38	0 65	1 00	1,059
EISKEW	0 56	0 79	0 50	-2 22	0 10	0 99	4 81	1,059
IVOLA	2 00%	1 33%	2 07%	0 00481	1 65%	2 66%	21 42%	1,059
Price	21 69	13 16	18 75	0 75	14 00	26 50	187 00	1,059
Bidder and Target Characteristics								
Bidder ROA	1 27%	1 06%	1 18%	-0 61%	0 89%	1 53%	19 81%	734
Bidder MB	9 31	24 87	3 11	0 01	1 33	8 07	316 67	449
Bidder MCAP (in billions)	$3 047	$8 893	$0 364	$0 003	$0 088	$1 976	$104 055	818
Target ROA	1 07%	0 49%	1 03%	-0 19%	0 73%	1 35%	2 74%	257
Target MB	1 60	1 16	1 27	0 07	0 96	1 86	12 02	249
Target MCAP (in billions)	$0 937	$6 021	$0 079	$0 002	$0 032	$0 243	$115 161	1,010
Relative Size	0 27	0 30	0 41	0 00	0 04	0 35	4 20	426
Deal Characteristics								
Premium	22 44%	63 47%	10 53%	-87 96%	-0 56%	33 41%	1664 00%	957
ACAR[-1 +1]	0 24%	4 50%	0 2%	-18 82%	-2 04%	2 52%	25 82%	1,060
TCAR[-1 +1]	8 97%	14 27%	3 8%	-29 14%	0 58%	13 5%	104 26%	1,060
Synergy[-1 +1]	1 00%	5 85%	0 76%	-16 90%	-1 20%	3 16%	100 52%	799
Stock	0 38	0 49	0	0	0	1	1	1,059
Competed	0 01	0 11	0	0	0	0	1	1,059
Geo Diversification	0 25	0 44	0	0	0	1	1	1,059
Activity Diversification	0 17	0 38	0	0	0	0	1	1,059
Gambling Propensity								
CFNAI	0 10	0 60	0 19	-1 97	-0 26	0 51	1 48	1,059
Variables Indicating Loss Space								
RET12	0 10	0 25	0 07	-0 52	-0 07	0 27	0 92	249
DIFF52	0 25	0 41	0 11	0 00	0 04	0 29	6 01	1,336
Net Income	230 44	883 91	10 93	0 26	3 64	63 76	7882 00	235

TABLE 3.3
Offer Price Premium

This table presents the results for OLS regressions of the offer price premium on lottery measures and control variables The offer price premium (*Premum*) is defined as the bid price over the target's stock price four weeks before the takeover announcement minus one *LIDX* measures the similarity of the target's stock's characteristics with salient features of lottery tickets *LIDX* increases with the attractiveness of the target as a gamble Its constituents are the price of the target's stock *(Price*), expected idiosyncratic skewness (*EISKEW*), and idiosyncratic volatility (*IVOLA*), all measured at the end of the second month prior to the month of the announcement All variables are defined in Appendix B *, **, and *** indicate significance at the 10%, 5% and 1% levels The *t*-statistics for the coefficient estimates are reported in square brackets below the estimates

Dependent Variable	*Offer Price Premium*							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	33 929** [2 290]	56 845*** [4 684]	39 017** [2 407]	66 674*** [4 264]	34 509* [2 190]	56 169*** [4 397]	41 041** [2 333]	75 390*** [4 566]
LIDX	39 641*** [2 770]				37 560** [2 490]			
EISKEW		9 940** [2 330]				9 493** [2 168]		
IVOLA			733 330* [1 796]				630 029 [1 416]	
Target Price				-0 197 [-0 505]				-0 162 [-0 410]
Bidder ROA	-3 028 [-0 497]	-4 751 [-0 760]	-2 660 [-0 427]	-4 267 [-0 554]	-3 611 [-0 556]	-4 652 [-0 704]	-2 694 [-0 406]	-6 506 [-0 822]
Bidder MB	-0 220 [-0 629]	-0 129 [-0 368]	-0 077 [-0 218]	-0 075 [-0 201]	-0 228 [-0 624]	-0 170 [-0 463]	-0 098 [-0 263]	-0 133 [-0 346]
Bidder MCAP	0 000 [-0 327]	0 000 [-0 177]	0 000 [-0 298]	0 000 [-0 263]	0 000 [-0 182]	0 000 [0 007]	0 000 [-0 208]	0 000 [0 035]
Target ROA	-5 380 [-0 875]	-6 424 [-1 031]	-6 070 [-0 964]	-7 470 [-0 790]	-6 147 [-0 955]	-6 966 [-1 072]	-6 689 [-1 014]	-13 917 [-1 416]
Target MB	-4 791 [-1 387]	-6 723* [-1 947]	-4 945 [-1 384]	-4 242 [-0 798]	-5 378 [-1 456]	-6 930* [-1 880]	-5 410 [-1 404]	-5 035 [-0 912]
Target MCAP	-0 001 [-0 561]	-0 003 [-1 088]	-0 002 [-0 796]	-0 001 [-0 315]	-0 002 [-0 617]	-0 003 [-1 007]	-0 002 [-0 818]	-0 002 [-0 602]
Relative Size	5 178 [0 510]	3 122 [0 307]	1 200 [0 118]	-12 718 [-0 809]	1 775 [0 150]	-2 304** [-0 199]	-3 265 [-0 275]	-29 916 [-1 477]
Stock					6 463 [0 827]	6 678 [0 848]	5 497 [0 672]	14 537* [1 671]
Competed					4 668 [0 208]	11 500 [0 513]	12 525 [0 551]	28 632 [1 086]
Geo Diversification					-2 174 [-0 298]	-4 818 [-0 664]	-2 457 [-0 324]	-6 933 [-0 801]
Activity Diversification					-0 055 [-0 009]	-0 616 [-0 099]	-1 022 [-0 161]	-7 320 [-0 920]
Adjusted R-squared	0 095	0 074	0 053	-0 026	0 063	0 047	0 018	-0 009
# of Observations	100	100	100	75	100	100	100	75

Table 3.4
Synergies

This table presents the results for OLS regressions of synergies on lottery measures and control variables Synergies are defined following Bradley, Desai, and Kim (1988) as weighted sum (by market capitalization) of the bidder and target cumulative abnormal announcement returns Bidder and target announcement returns are computed using the [-1,+1] event window and a market model estimated over days [-230,-31] *LIDX* measures the similarity of the target's stock's characteristics with salient features of lottery tickets *LIDX* increases with the attractiveness of the target as a gamble Its constituents are the price of the target's stock (*Price*), expected idiosyncratic skewness (*EISKEW*), and idiosyncratic volatility (*IVOLA*), all measured at the end of the second month prior to the month of the announcement All variables are defined in Appendix B *, **, and *** indicate significance at the 10%, 5% and 1% levels The *t*-statistics for the coefficient estimates are reported in square brackets below the estimates

Dependent Variable	*Synergy[-1 +1]*							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	0 011 [0 393]	0 028 [1 595]	0 022 [0 960]	0 030 [1 267]	-0 008 [-0 247]	0 022 [1 271]	0 007 [0 305]	0 022 [0 904]
LIDX	0 019 [0 708]				0 034 [1 142]			
EISKEW		0 000 [0 056]				0 000 [0 060]		
IVOLA			0 226 [0 384]				0 566 [0 944]	
Target Price				-0 001 [-0 898]				0 000 [-0 737]
Bidder ROA	-0 019* [-1 677]	-0 017* [-1 896]	-0 017* [-1 932]	-0 019 [-1 653]	-0 016 [-1 387]	-0 015 [-1 617]	-0 015* [-1 668]	-0 017 [-1 436]
Bidder MB	0 001** [2 259]	0 001** [2 824]	0 001*** [2 828]	0 001** [2 364]	0 002*** [2 669]	0 002*** [3 206]	0 002*** [3 263]	0 002*** [2 712]
Bidder MCAP	0 000 [1 215]	0 000 [0 554]	0 000 [0 580]	0 000 [1 378]	0 000 [0 370]	0 000 [-0 065]	0 000 [-0 073]	0 000 [0 641]
Target ROA	0 015 [1 058]	0 010 [1 101]	0 010 [1 084]	0 016 [1 154]	0 019 [1 279]	0 008 [0 886]	0 008 [0 850]	0 017 [1 150]
Target MB	-0 01 [-1 300]	-0 009* [-1 821]	-0 009* [-1 698]	-0 010 [-1 290]	-0 012 [-1 402]	-0 008 [-1 639]	-0 007 [-1 371]	-0 011 [-1 343]
Target MCAP	0 000 [-0 069]	0 000 [0 108]	0 000 [0 174]	0 000 [-0 096]	0 000 [0 073]	0 000 [0 083]	0 000 [0 262]	0 000 [-0 125]
Relative Size	0 046* [1 946]	0 005 [0 357]	0 006 [0 410]	0 044* [1 889]	0 036 [1 170]	-0 003 [-0 219]	0 000 [-0 009]	0 029 [0 970]
Stock					-0 009 [-0 684]	-0 004 [-0 355]	-0 006 [-0 559]	-0 004 [-0 294]
Competed					0 062 [1 578]	0 096*** [3 122]	0 096*** [3 148]	0 063 [1 612]
Geo Diversification					0 02 [1 489]	0 013 [1 317]	0 015 [1 513]	0 016 [1 249]
Activity Diversification					0 002 [0 140]	-0 002 [-0 222]	-0 001 [-0 099]	0 000 [-0 021]
Adjusted R-squared	0 123	0 070	0 072	0 127	0 148	0 147	0 156	0 138
# of Observations	75	75	75	75	75	75	75	75

Table 3.5
Announcement Returns

This table presents the results for OLS regressions of bidder announcement returns (ACAR[-1,+1]) in Panel A and target announcement returns (TCAR[-1,+1]) in Panel B on lottery measures and control variables Bidder and target cumulative abnormal announcement returns are computed using the [-1,+1] event window and a market model estimated over days [-230,-31] The lottery index *LIDX* measures the similarity of the target's stock's characteristics with salient features of lottery tickets *LIDX* increases with the attractiveness of the target as a gamble Its constituents are the price of the target's stock (*Price*), expected idiosyncratic skewness (*EISKEW*), and idiosyncratic volatility (*IVOLA*), all measured at the end of the second month prior to the month of the announcement All variables are defined in Appendix B *, **, and *** indicate significance at the 10%, 5% and 1% levels The *t*-statistics for the coefficient estimates are reported in square brackets below the estimates

Panel A: Bidder Announcement Returns

	Bidder CAAR (-1 1)							
Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	0 013 [0 695]	0 008 [0 554]	-0 003 [-0 166]	0 026 [1 358]	0 006 [0 321]	0 009 [0 565]	-0 015 [-0 708]	0 016 [0 784]
LIDX	-0 008 [-0 446]				0 004 [0 198]			
EISKEW		-0 003 [-0 468]				-0 002 [-0 294]		
IVOLA			0 440 [0 874]				0 865 [1 649]	
Target Price				0 000 [0 082]				0 000 [-0 183]
Bidder ROA	-0 008 [-1 022]	-0 007 [-0 947]	-0 008 [-1 085]	-0 017* [-1 846]	-0 011 [-1 416]	-0 011 [-1 341]	-0 012 [-1 483]	-0 018* [-1 832]
Bidder MB	0 000 [0 959]	0 000 [0 935]	0 000 [0 866]	0 001 [1 426]	0 001 [1 240]	0 001 [1 292]	0 001 [1 347]	0 001 [1 662]
Bidder MCAP	0 000 [0 775]	0 000 [0 738]	0 000 [0 863]	0 000* [1 726]	0 000 [0 468]	0 000 [0 434]	0 000 [0 471]	0 000 [1 472]
Target ROA	0 001 [0 077]	0 001 [0 110]	0 000 [0 025]	-0 005 [-0 470]	0 000 [0 046]	0 000 [0 060]	0 000 [-0 032]	0 000 [-0 005]
Target MB	-0 003 [-0 678]	-0 003 [-0 590]	-0 002 [-0 415]	-0 002 [-0 338]	-0 004 [-0 820]	-0 004 [-0 850]	-0 002 [-0 449]	-0 003 [-0 464]
Target MCAP	0 000 [0 289]	0 000 [0 378]	0 000 [0 543]	0 000 [-0 972]	0 000 [0 129]	0 000 [0 075]	0 000 [0 411]	0 000 [-0 926]
Relative Size	-0 041*** [-3 155]	-0 040*** [-3 172]	-0 037*** [-2 971]	-0 059*** [-3 099]	-0 023 [-1 615]	-0 025* [-1 782]	-0 019 [-1 351]	-0 039 [-1 565]
Stock					-0 006 [-0 669]	-0 006 [-0 627]	-0 010 [-1 024]	-0 005 [-0 485]
Competed					-0 047* [-1 724]	-0 047* [-1 709]	-0 046* [-1 724]	-0 037 [-1 153]
Geo Diversification					0 016* [1 843]	0 016* [1 830]	0 020** [2 207]	0 013 [1 260]
Activity Diversification					0 005 [0 660]	0 005 [0 598]	0 007 [0 871]	0 011 [1 096]
Adjusted R-squared	0 052	0 053	0 058	0 106	0 081	0 081	0 108	0 110
# of Observations	100	100	100	75	100	100	100	75

Table 3.5 (continued)

Panel B: Target Announcement Returns

Dependent Variable	*Target CAAR(-1 1)*							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	0 163 [1 429]	0 327*** [3 470]	0 264** [2 237]	0 398*** [4 114]	0 062 [0 489]	0 317*** [3 144]	0 202 [1 533]	0 395*** [3 848]
LIDX	0 271** [2 467]				0 377*** [3 221]			
EISKEW		0 033 [1 063]				0 041 [1 250]		
IVOLA			2 839 [0 959]				4 928 [1 557]	
Target Price				-0 005** [-2 116]				-0 004* [-1 823]
Bidder ROA	-0 050 [-1 059]	-0 056 [-1 129]	-0 052 [-1 054]	-0 046 [-0 971]	-0 014 [-0 305]	-0 027 [-0 533]	-0 021 [-0 426]	-0 022 [-0 441]
Bidder MB	0 004 [1 517]	0 004 [1 632]	0 004** [1 668]	0 004* [1 790]	0 004* [1 681]	0 004* [1 669]	0 004* [1 757]	0 004* [1 750]
Bidder MCAP	0 000 [-0 998]	0 000 [-0 862]	0 000 [-0 961]	0 000 [-0 521]	0 000* [-1 924]	0 000 [-1 385]	0 000 [-1 635]	0 000 [-1 070]
Target ROA	0 014 [0 241]	-0 001 [-0 013]	-0 009 [-0 156]	0 024 [0 405]	0 060 [1 026]	0 024 [0 391]	0 014 [0 233]	0 036 [0 589]
Target MB	-0 043 [-1 312]	-0 042 [-1 219]	-0 031 [-0 902]	-0 039 [-1 190]	-0 039 [-1 184]	-0 033 [-0 937]	-0 019 [-0 561]	-0 033 [-0 969]
Target MCAP	0 000 [0 369]	0 000 [-0 086]	0 000 [0 077]	0 000 [0 168]	0 000 [0 958]	0 000 [0 328]	0 000 [0 546]	0 000 [0 382]
Relative Size	-0 047 [-0 487]	-0 062 [-0 621]	-0 058 [-0 576]	-0 071 [-0 728]	0 001 [0 010]	-0 093 [-0 734]	-0 055 [-0 425]	-0 078 [-0 620]
Stock					-0 148*** [-2 762]	-0 107* [-1 936]	-0 121** [-2 140]	-0 088 [-1 633]
Competed					0 116 [0 748]	0 195 [1 186]	0 178 [1 095]	0 141 [0 860]
Geo Diversification					0 064 [1 186]	0 011 [0 202]	0 034 [0 601]	0 018 [0 336]
Activity Diversification					-0 022 [-0 474]	-0 024 [-0 467]	-0 036 [-0 713]	-0 044 [-0 887]
Adjusted R-squared	0 090	0 023	0 020	0 069	0 169	0 054	0 067	0 080
# of Observations	75	75	75	75	75	75	75	75

Table 3.6
Robustness Checks

This table presents the results for OLS regressions of the offer price premium (*Premium*), bidder announcement returns (*ACAR[-1,+1]*), target announcement returns (*TCAR[-1,+1]*), and *Synergy[-1 +1]* on our lottery measures LIDX and control variables Bidder and target cumulative abnormal announcement returns are computed using the [-1,+1] event window and a market model estimated over days [-230,-31] *Synergy[-1,+1]* is defined following Bradley, Desai, and Kim (1988) as the weighted sum (by market capitalization) of the bidder and target cumulative abnormal announcement returns The lottery index *LIDX* measures the similarity of the target stock's characteristics with salient features of lottery tickets *LIDX* increases with the attractiveness of the target as a gamble Its constituents are the price of the target's stock (*Price*), expected idiosyncratic skewness (*EISKEW*), and idiosyncratic volatility (*IVOLA*), all measured at the end of the second month prior to the month of the announcement All variables are defined in Appendix B This table reports the coefficient estimates of *LIDX* and its *t*-statistic (in brackets), as well as the number of observations below the estimates The baseline regression is model (5) from Tables I to III The baseline regression is rerun for eight different subsamples (i) only deals with bidders above or below the median bidder size in the years of the takeover announcements, (ii) only deals with targets above or below the median in the respective years of the takeover announcements, (iii) only deals announced when investor sentiment is above or below the median over our sample period, where investor sentiment data are taken from Jeffrey Wurgler's website and lagged by two months, and (iv) only deals with negative or positive *CFNAI* *, **, and *** indicate significance at the 10%, 5% and 1% levels The *t*-statistics for the coefficient estimates are reported in square brackets below the estimates The number of observations for each regression is reported below the *t*-statistic

	Premium	*Synergy[-1 +1]*	*ACAR[-1 +1]*	*TCAR[-1 +1]*
	(1)	(4)	(2)	(3)
(1) Baseline	37 560**	0 034	0 004	0 377***
	[2 490]	[1 142]	[0 198]	[3 221]
	100	75	100	75
(2) Large Bidder	42 131***	0 008	0 007	0 348***
	[2 886]	[0 318]	[0 377]	[2 634]
	74	55	74	55
(3) Small Bidder	62 113	0 018	-0 013	0 486
	[1 351]	[0 256]	[-0 191]	[0 786]
	26	20	26	20
(2) - (3)	-19 983**	-0 01	0 02	-0 138
	[-2 177]	[-0 618]	[1 491]	[-0 988]
(4) Large Target	23 122	-0 007	0 002	0 106
	[1 646]	[-0 224]	[0 089]	[0 968]
	60	43	60	43
(5) Small Target	29 761	0 031	0 007	0 744**
	[0 717]	[0 513]	[0 166]	[2 322]
	40	32	40	32
(4) - (5)	-6 64	-0 038***	-0 005	-0 638***
	[-0 975]	[-3 247]	[-0 715]	[-10 800]
(6) High Sentiment	39 821*	0 01	0 01	0 308**
	[1 689]	[0 182]	[0 290]	[2 061]
	43	34	43	34
(7) Low Sentiment	34 837	0 043	0 014	0 304
	[1 560]	[1 358]	[0 645]	[1 625]
	57	41	57	41
(6) - (7)	4 984	-0 033***	-0 004	0 004
	[1 031]	[-3 231]	[-0 595]	[0 096]
(8) Positive CFNAI	30 601	0 033	0 013	0 295**
	[1 552]	[0 719]	[0 449]	[2 389]
	57	39	57	39
(9) Negative CFNAI	40 515	0 034	0 044	0 328
	[1 326]	[1 006]	[1 585]	[1 547]
(8) - (9)	-9 915*	-0 001	-0 032***	-0 033
	[-1 857]	[-0 144]	[-5 604]	[-0 815]

TABLE 3.7
Acquirer and Target Valuation (Performance) Before Merger Announcements by Method of Payment

Panel A: P/V Based on Three-period Forecast Horizon Residual Income Model

This panel reports how the two valuation measures, the price-to-book ratio *P/B (2 years before)* and the price-to–intrinsic income value ratio *P/V* are related to the method of payment The intrinsic value is estimated using a three-period forecast horizon residual income model, where the cost of capital ($r_e(t)$) is based on firm-specific CAPM and the discount rate is set at 12 5% The t-statistics of differences between acquirer and target and between stock and cash offers are reported in brackets The sample includes successful merger bids for public targets during 1985–2006 N refers the number of bidders with valuation measures available ***, **, and * denote that the difference in means is significant at the 1%, 5%, and 10% levels, respectively

		(1) Acquirer	(2) Target	(1) - (2)	N
Cash	*P/B (2 years before)*	2 74	2 78	-0 05	341
				[-0 17]	
	P/V ($r_e(t)$=12 5%)	5 24	3 9	1 34*	137
				[1 662]	
	P/V	5 52	6 62	-1 1	137
				[-0 489]	
Stock	*P/B (2 years before)*	4 49	1 94	2 55***	188
				[9 80]	
	P/V ($r_e(t)$=12 5%)	6 28	3 97	2 31**	61
				[3 00]	
	P/V	7 82	4 63	3 19***	61
				[2 7]	
All	*P/B (2 years before)*	3 55	2 42	1 12***	529
				[5 64]	
	P/V ($r_e(t)$=12 5%)	5 56	3 64	1 92***	198
				[3 38]	
	P/V	6 23	6 17	0 06	198
				[0 03]	
		(5)	(6) Public		
Stock–Cash	*P/B (2 years before)*	1 75***	-0 84***		
(t-statistic)		[6 10]	[-3 51]		
Stock–Cash	*P/V (K=12 5%)*	1 04	0 07		
(t-statistic)		[1 25]	[1 00]		
Stock–Cash	*P/V*	2 3**	-1 99		
(t-statistic)		[2 19]	[-0 96]		

Table 3.7 (continued)

Panel B: P/V Based on Perpetual Residual Income Model

This panel reports how the two valuation measures, the price-to-book ratio *P/B (2 years before)* and the price-to–intrinsic value ratio *P/V*, are related to the method of payment. The intrinsic value is estimated using our constructed perpetual residual income model, when the cost of capital ($r_e(t)$) is based on firm-specific CAPM, as well as when the discount rate is set at 12 5%. The t-statistics of differences between acquirer and target, and between stock and cash offers, are reported in brackets. The sample includes successful merger bids aiming at public targets during 1985–2006 N refers the number of bidders with valuation measures available. ***,**,* denote that the difference in means is significant at the 1%, 5% and 10% level, respectively

		(1) Acquirer	(2) Target	(1) - (2)	N
Cash	*P/B (2 years before)*	2.74	2.78	-0.05	341
				[-0 17]	
	P/V ($r_e(t)$=12 5%)	3 44	1 61	1.42***	341
				[8.51]	
	P/V	3.69	1 39	2.05***	341
				[6.13]	
Stock	*P/B (2 years before)*	4 49	1.94	2.55***	188
				[9.80]	
	P/V ($r_e(t)$=12 5%)	4	1 84	2 17***	187
				[4 08]	
	P/V	4 66	1 61	3.33***	183
				[6.03]	
All	*P/B (2 years before)*	3 55	2 42	1.12***	529
				[5 64]	
	P/V ($r_e(t)$=12 5%)	3 64	1 96	1.67***	528
				[5 20]	
	P/V	4 08	1 55	2 53***	524
				[8 54]	
		(5) Acquirers	(6) Public		
Stock–Cash	*P/B (2 years before)*	1 75***	-0 84***		
(t-statistic)		[6 10]	[-3 51]		
Stock–Cash	*P/V ($r_e(t)$=12 5%)*	0.57	0.23		
(t-statistic)		[1.10]	[1.38]		
Stock–Cash	*P/V*	0 96*	0.22*		
(t-statistic)		[1.75]	[1.84]		

Table 3.7 (continued)

Panel C: Acquirer and Target Prior Performance by Method of Payment

This panel reports how the bidder performances before the merger announcements are related to the method of payment *DIFF52* refers to the bidder's stock price at the end of month t - 2 over the 52-week high over the months t -13 to t - 2 minus one, *NI* refers to net income in the last fiscal year before the takeover announcement, *ROA* refers to return-on-assets in the last fiscal year before the takeover announcement,

The t-statistics of differences between acquirer and target, and between stock and cash offers, are reported in brackets The sample includes successful merger bids aiming at public targets during 1985–2006 N refers the number of observations ***,**,* denote that the difference in means is significant at the 1%, 5% and 10% level, respectively

		Acquirer of Public Targets		
		(1) Acquirer	(2) Target	(1) - (2) [t-Statistic]
Cash	*DIFF52*	0 236	0 255	-0 018
	n	862	848	[-0 935]
	NI	93 988	64 864	29 124
	n	550	531	[0 865]
	ROA	1 11%	1 02%	0 089%*
	n	580	223	[1 699]
Stock	*DIFF52*	0 285	1 319	-1 034***
	n	474	264	[-9 461]
	NI	388 391	59 556	328 835***
	n	295	220	[4 364]
	ROA	1 38%	1 12%	0 263%***
	n	345	90	[3 512]
All	*DIFF52*	0 254	0 507	-0 254***
	n	1336	1112	[-7 691]
	NI	196 768	63 309	133 459***
	n	845	751	[3 796]
	ROA	1 21%	1 05%	0 162%***
	n	925	313	[3 750]
		(3) Acquirers	(4) Targets	
Stock–Cash	*DIFF52*	0 049*	1 065***	
(t-statistic)		[1 943]	[9 849]	
Stock–Cash	*NI*	294 403***	-5 308	
(t-statistic)		[3 814]	[-0 181]	
Stock–Cash	*ROA*	0 272%***	0 10%	
(t-statistic)		[4 001]	[1 597]	

TABLE 3.8
Gambling in the Loss (Win) Space

This table presents the results for OLS regressions of the offer price premium (*Premium*), bidder announcement returns (*ACAR[-1,+1]*), target announcement returns (*TCAR[-1,+1]*), and *Synergy[-1,+1]* on our lottery measures *LIDX* and control variables Bidder and target cumulative abnormal announcement returns are computed using the [-1,+1] event window and a market model estimated over days [-230,-31] *Synergy[-1,+1]* is defined following Bradley, Desai, and Kim (1988) as the weighted sum (by market capitalization) of the bidder and target cumulative abnormal announcement returns *LIDX* measures the similarity of the target stock's characteristics with salient features of lottery tickets *LIDX* increases with the attractiveness of the target as a gamble Its constituents are the price of the target's stock (*Price*), expected idiosyncratic skewness (*EISKEW*), and idiosyncratic volatility (*IVOLA*), all measured at the end of the second month prior to the month of the announcement This table reports the coefficient estimates of *LIDX* and its *t*-statistic, as well as the number of observations below the estimates The baseline regression is model (5) from Tables I to III The baseline regression is rerun for six different subsamples (i) above or below the median *DIFF52* (the ratio of the bidder's stock price at the end of month t - 2 and the 52-week high over the months t -13 to t - 2 minus one), (ii) above or below *RET12* (the cumulative abnormal return of the bidder's stock calculated over months t - 13 to t - 2 for a takeover announcement in month t), and (iii) negative or positive *NI12* (net income in the last fiscal year before the takeover announcement) *, **, and *** indicate significance at the 10%, 5% and 1% levels The *t*-statistics for the coefficient estimates are reported in square brackets below the estimates The number of observations for each regression is reported below the *t*-statistic

Variable	*Premium*	*Synergy[-1 +1]*	*ACAR[-1 +1]*	*TCAR[-1 +1]*
	(1)	(4)	(2)	(3)
(1) Baseline	37 560**	0 034	0 004	0 377***
	[2 490]	[1 142]	[0 198]	[3 221]
	100	75	100	75
(2) Small Diff52	28 263	0 062	0 053	0 634**
	[0 633]	[1 277]	[1 045]	[2 497]
	32	32	32	32
(3) Large Diff52	10 358	0 046	0 032	0 184
	[0 395]	[1 080]	[1 008]	[1 192]
	43	43	43	43
(2) - (3)	17 905**	0 016	0 021**	0 450***
	[-2 024]	[-1 491]	[-2 060]	[-8 885]
(4) High RET12	63 069*	0 009	-0 003	0 342*
	[2 492]	[0 358]	[-0 133]	[1 68]
	53	38	53	38
(5) Low RET12	45 534*	0 04	0 028	0 268
	[2 012]	[0 817]	[0 797]	[1 468]
	45	36	45	36
(4) - (5)	17 534***	-0 031***	-0 032***	0 073*
	[3 671]	[-3 876]	[-5 134]	[1 838]
(6) Positive *NI*	51 456**	0 006	0 038	0 108
	[2 141]	[0 126]	[1 113]	[0 511]
	38	28	38	28
(7) Negative *NI*	45 314*	-0 044	-0 060**	0 166
	[1 724]	[-1 076]	[-2 222]	[0 890]
	51	38	51	38
(6) - (7)	6 142	0 050***	0 098***	-0 057
	[1 146]	[4 443]	[14 686]	[-1 141]

Chapter IV

Envy-Motivated U.S. Bank Merger Waves

4.1 Introduction

The question of how to explain merger waves has been listed as one of the "ten unsolved problems in finance" (Brealey and Myers (1996)).[20] The classic textbook of Brealey and Myers (1996, p. 997) states, "What we need is a general hypothesis to explain merger waves. For example, everybody seemed to be merging in 1995 and nobody 5 years earlier. Why? ... We need better theories to help explain these 'bubbles' of financial activity."

Merger waves refer to periods of very intense merger and acquisition activity (Gaughan (1999)). During the past 100 years, the United States experienced five complete merger waves[21]: those of the early 1900s, the 1920s, the 1960s, the 1980s, and the 1990s.[22] The academic literature has provided various explanations for the waves. Gorton, et al. (2009) point out that there are two salient facts about mergers since the 1980s: First, the average post-acquisition returns of bidders are negative. Studies that find negative average returns to bidders include those of You, Caves, Smith and Henry (1986), Varaiya and Ferris (1987), Bradley, Desai and Kim (1988), Asquith, Bruner, and Mullins (1990), Jennings and Mazzeo (1991), Servaes (1991),

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[20] In Brealey and Myer's classic textbook *Principles of Corporate Finance* (1996, p 997), the "ten unsolved problems in finance" refer to the following

> 1 What determines project risk and present value? 2 Risk and return---What have we missed? 3 How important are the exceptions to the efficient-market theory? 4 Is management an off-balance-sheet liability? 5 How can we explain the success of new securities and new markets? 6 How can we resolve the payout controversy? 7 What risks should a firm take? 8 What is the value of liquidity? 9 How can we explain merger waves? 10 How can we explain international differences in financial architecture?

[21] Some researchers have also investigated the sixth wave, from mid-2003 to 2007, which happened in both the United States and Europe (e g , Lipton (2006), Martynova and Renneboog (2008), Alexandridis, Mavrovitis, and Travlos (2011))

[22] According to Gaughan (1999), the first merger wave (1897–1904) featured a transformation of the American economy from one of many small companies to larger, sometimes monopolistic firms dominating an industry The second merger wave (1916–1929) began in 1916 and continued until the economic downturn in 1929, featured many of the same types of horizontal transactions as the first wave, but also had a good percentage of vertical transactions It has been said that the first wave comprised mergers leading to a monopoly period, while the second wave comprised mergers leading to an oligopoly period This pattern was mirrored again in the third merger wave (1965–1969), which featured conglomerate acquisitions, acquiring targets outside of the bidder's own industry Such deals were partly caused by the fact that bidding companies wanted to expand but were restrained by the intense antitrust enforcement that prevailed in the 1950s and 1960s The only alternative left for expansion-minded companies was to look outside their industry and buy companies that would not be considered in any way a strategic fit by today's standards The fourth merger wave (1981–1989) coincided with Ronald Reagan's presidency and was known for both its megamergers and its colorful hostile deals

Banerjee and Owers (1992), and Byrd and Hickman (1992) See also the survey by Andrade, Mitchell, and Stafford (2001) Second, mergers concentrate in industries for which a technological or regulatory regime shift can be identified—such as commercial banking, telecommunications, investment banking, hotels and casinos, and oil and gas—making mergers an efficient response (Mitchell and Mulherin (1996), Andrade, Mitchell, and Stafford (2001), and Andrade and Stafford (2004))

The fifth wave (1993–2000) followed the economic recession of 1990–1991, coinciding with Bill Clinton's presidency, with the general feature that strategic bidders seeking for targets in related alone business lines (Bruner (2004)) Bruner (2004) points out that the high merger activity in banking warrants investigation, since this sector-focused activity responded to overcapacity as the industry was deregulated Jones and Critchfield (2005) also note the influence of deregulation on the bank merger wave These authors focus on the merger activities in the banking industry from 1985 to 2006, which covers the highly concentrated merger period corresponding to the fifth merger wave Sereval studies point out that mergers and acquisitions during the fifth merger cycle, during 1993–2000, were characterized by extensive overpayments, mega-deals, the overvaluation of acquiring firms, the prevalence of equity financing, and significant value destruction for acquiring firm shareholders (Andrade, Mitchell, and Stafford (2001), Dong, Hirshleifer, Richardson and Teoh (2006), Moeller, Schlingemann, and Stulz (2005))

Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004) construct theoretical models showing that merger waves are driven by misvaluations in the stock market Rhodes-Kropf, Robinson, and Viswanathan (2005) and Dong, Hirshleifer, Richardson and Teoh (2006), find that bidders were more overvalued than targets in the 1980s and 1990s Bouwman, Fuller, and Nain (2009) compare acquisitions during booming markets with those during depressed markets and find that bidders buying during high-valuation markets have significantly higher announcement returns but lower long-run abnormal stock and operating performance than those buying during low-valuation markets Bouwman, Fuller, and Nain (2009) contend that managerial herding explains these results

Goel and Thakor (2010) develop a theory and provide empirical evidence showing that envy among chief executive officers (CEOs) can generate merger waves, even when the shocks that precipitated the initial mergers are purely idiosyncratic for

the first firm in the wave. Envy-based[23] preferences have been investigated on basis of biological,[24] psychological,[25] sociological,[26] and economic[27] foundations in recent research studies. Martin's (1981) experiment shows that individuals are most inclined to compare their fortunes to those who are "near us in time, place, age, or reputation" (Aristotle, in *Rhetoric*, 1388a) and it is more important to not be worse off than to be better off than one's peers.

Numerous economic studies "take the view that people are motivated by considerations of fairness and thus wish to reduce inequity" (Goel and Thakor (2005), p. 2257). Based on game theory analysis, Fehr and Schmidt (1999) find evidence that fairness (or inequity aversion) motives affect many people's behavior, and that cooperators will punish those who are selfishly noncooperative when given the opportunity, even if the punishment is costly for those the punishers. In addition, Charness and Grosskopf (2001) and Charness and Rabin (2002) examine the implications of relative consumption preferences. Specifically, Charness and Grosskopf (2001) use simple binary decisions and self-reported happiness to distinguish a person's desire to achieve the social optimum, equality, or an advantageous relative standing, but observe very little concern about relative payoffs in their experimental games. By designing a range of experimental games, Charness and Rabin (2002) show that individuals are more willing to increase social welfare—by sacrificing to increase the payoffs for all recipients, especially low-payoff recipients—than to reduce differences in payoffs. Individuals are also

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[23] Aristotle defines envy as "the pain caused by the good fortune of others" (in *Rhetoric, 1180b*), while Kant (1797) defines it as "a reluctance to see our own well-being overshadowed by another's because the standard we use to see how well off we are is not the intrinsic worth of our own well-being but how it compares with that of others " Parrott and Smith (1993) define envy as an emotion that "occurs when a person lacks another's *(perceived)* superior quality, achievement, or possession and either desires it or wishes that the other lacked it."

[24] Robson (2001) assert the biological foundations of envy arise from evolution and that envy is tied with the preference of maximizing "reproductive success "

[25] Adams (1963) founded the psychological foundations of envy by proposing a theory of inequity in terms of discrepancies between a man's job inputs and job outcomes and the behavior that can result from these discrepancies

[26] The sociological implications of envy are discussed by Elster (1991), who argues that when we observe another person's consumption, we tend to be more envious of those who are more similar to us Salovey and Rodin (1984) conducted a laboratory study and provide supportive evidence for the assertion

[27] "There is a significant literature in economics that has examined the implications of various forms of relative consumption preferences (e g , Fehr and Schmidt (1999), Bolton and Ockenfels (2000), Charness and Rabin (2002)) Other papers use envy-based preferences to explain a variety of economic phenomena, such as emulative activity (Clark and Oswald (1998)), involuntary unemployment (Akerlof and Yellen (1990)), progressive taxation (Banerjee (1990)), wage compression (Frank (1984), Lazear (1989), Levine (1991)), suboptimal innovation (Mui (1995)), and intrafirm allocational distortions, such as corporate socialism in investment (Goel and Thakor (2005))" (Geol and Thakor (2010), p 489)

motivated by reciprocity but become unwilling to sacrifice to achieve a fair outcome when others are unwilling to sacrifice, and will sometimes punish unfair behavior.

Zizzo and Oswald (2001) study utility interdependence in the laboratory and find subjects will even burn the money of others at the cost of giving up some of their own cash. Moreover, many burners, especially disadvantaged ones, care about whether others "deserve" the money they have, where deservingness is not simply a matter of relative payoff. Cason and Mui (2002) provide evidence of the importance of psychological considerations in determining how distributional conflicts can prevent Pareto improving innovations. Potentially Pareto improving economic innovations are likely to be avoided when they benefit some people more than they do others. Overall, most economic studies find that individuals are averse to being worse off than others.

"While the behavioral manifestations of envy are more sophisticated in adults, its presence does not seem to diminish with age" (Goel and Thakor (2005), p. 2255). Despite the fact that research on envy-related issues in economics has gained significant attention, envy has been relatively infrequently considered in corporate finance. Goel and Thakor (2005) develop a framework to model envy in corporate finance where agents exhibit envy-based preferences. That is, an envious agent's utility increases with his or her consumption and resources and decreases with that of others. The authors provide a new perspective on the nature of investment distortions with centralized and decentralized capital budgeting systems. They find that envy leads to corporate socialism when capital is centrally allocated, whereas decentralized capital budgeting leads to overinvestment. Thus, envy decreases firm value.

Goel and Thakor's (2010) model assumes that the preferences of CEOs depend on both absolute and relative consumption—with relative consumption preferences characterized by envy—and shows that merger waves can arise even when the shocks that precipitated the initial mergers in the wave are idiosyncratic. Envy "induces a correlation in merger activities by making other CEOs in this cohort envious of the larger firm size and compensation now linked with the CEO of the firm that acquired first" (Goel and Thakor (2010), p. 490). The authors' analysis predicts and proves that the earlier acquisitions produce higher bidder returns, involve smaller targets, and result in higher compensation gains for the bidder's top management team than the later acquisitions in the wave. Consequently, Goel and Thakor (2010) view envy as the key driving force behind merger waves.

Table 2.1 shows that annual U.S. bank merger activity increased tremendously in 1993, from 96 to 161 deals, and remained high till 2000.[28] The merger wave began before the Riegle–Neal Interstate Banking and Branching Efficiency Act, passed by the Congress on September 29, 1994, which allowed interstate branching and is often cited as important evidence of deregulation (Cho (2010), Jones and Critchfield (2005)). Harford (2005) documents that economic, regulatory, and technological shocks, together with the availability of sufficient capital market liquidity, drive industry merger waves. This leaves open the question of what might cause a merger wave if the precipitating shock is neither market mispricing nor industrial shock but is just idiosyncratic to a few firms (Goel and Thakor (2010)).

Moreover, bank mergers are likely to have occurred as a result of the dismantling of interstate branching restrictions, which facilitates the pursuit of scale economies (Lambrecht (2004)). However, some empirical evidence (Berger and Hannan (1989, 1992), Berger (1995)) contradicts this efficiency-based interpretation and shows that concentration leads to unfavorable prices for customers. Chapter II also shows that geographic and activity diversification decreases bidder wealth, as reflected in their negative abnormal returns around the merger announcement, which is consistent with the evidence of DeLong (2001) that further negates the assumption of scale economies.

This study investigates whether envy contributes to the formation of U.S. banking merger waves. We adopt the concept of clusteredness from Harford (2005) and Yan (2009)[29] and use the detrending method of Bouwman, Fuller, and Nain (2009) to define bank merger waves. The main conjecture is developed based on the theory of Geol and Thakor (2010); specifically, their three empirical predictions, concerning target size, announcement returns, and compensation increase, are retested in the banking context. Another two hypotheses, with respect to bidder size and synergy, are developed and supported with evidence. Finally, the long-term value creation of bidders is also tested. The purpose of this study is to investigate whether the envious psychology of bank managers causes the clusteredness of bank mergers.

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[28] We also checked the number of all U.S banking mergers bids during 1980–2006, including both successful and unsuccessful deals (see Appendix C). We found that bank merger activity increased as early as 1990, and some merger-clustered months are also found in 1986 and 1987

[29] Yan (2009) particularly addresses the issue of bidders' worse post-merger performance in horizontal mergers The author presents a model to explain why value-maximizing firms conduct mergers that appear to lower shareholder value by incorporating imperfect product market competition into the standard neoclassical framework, which assumes value maximization and market efficiency.

Essay III is organized as follows Section II develops our hypotheses based on related literature Section III describes the methodology and data Section IV reports the empirical results Section V summarizes our findings and offers conclusions

4.2 Hypothesis Development

What do CEOs envy? Bliss and Rosen (2001) investigate the effect of bank mergers on executive compensation during 1986–1995 and find acquisitions significantly increase CEO compensation, even after the typical announcement date stock price decline is subtracted from subsequent salary gains This CEO compensation is hardwired to firm size, and acquisition is an easy way to rapidly increase it The preferences of CEOs are based on both absolute and relative consumption, with relative consumption preferences characterized by envy (Goel and Thakor (2010)) Apart from increasing their compensation through firm growth, managers are likely to serve their private interests in various ways, such as increasing the resources under their control, boosting their prestige (Stulz (1990)), decreasing their unemployment risk, creating additional middle manager promotions, and making managers more indispensable to the firm (Shleifer and Vishny (1989)) Motivations for constructing "empires" apparently reflect executives' hunger for status, power, compensation, and prestige (Baumol (1959), Marris (1964), Williamson (1974), Jensen (1986)) All of these benefits obtained by mergers can increase a CEO's utility and incur the envy of other CEOs

Therefore, firm size, or market capitalization, is a good proxy for managerial envy-based preferences, that is, a bank CEO always envies another CEO working in a bigger bank A CEO's utility increases with the difference between his or her firm size-based benefits (especially consumption) and those of the envied CEO

4.2.1 Early versus Late Bidders

The main conjecture of this essay is that envy-based preferences are responsible for why bank mergers come in waves Since CEOs envy each other based on relative benefits and the CEOs of bigger firms get paid more, a merger in the industry that increases bank size for one CEO will tempt other envious CEOs to undertake size-enhancing instead of value-enhancing acquisitions, thereby starting a merger wave

In the model of Goel and Thakor (2010), the wave starts with a CEO of a firm within a size cohort receiving a possibly idiosyncratic shock that justifies an acquisition. The acquisition leads to increased firm size and CEO benefits. As Goel and Thakor (2010, p. 489) state,

> In the absence of envy, the story would end right here if the shock is purely idiosyncratic. Envy, however, induces a correlation in merger activities by making other CEOs in this cohort envious of the larger firm … and linked with the CEO of the firm that acquired first..

Since a person envies others who are closet, a CEO envies those CEOs who are in the same cohort or reference group. Following Goel and Thakor (2010), we assume all bidders are initially of the same size in each wave, so that the CEOs of early bidding banks are in the same reference group as the late bidders. Consequently, early acquisition bidders are expected to have the same market value as late acquisition bidders, which leads to our first hypothesis.

H1: A bidding firm in an early acquisition has the same market value as a bidder in a late acquisition.

The reasoning behind this hypothesis is that if the early bidders are smaller than the late ones, acquisitions are less likely to boost their market value, and thus less prone to eliciting envy-based merger motivations from later bidders. Therefore, merger waves are less likely when the early bidders are smaller than the later bidders.

4.2.2 Early versus Late Target (Transaction)

If you are a bidder, which target firm would you prefer, the smaller or the bigger one? Literature shows smaller firms are more attractive to bidders, for two main reasons. First, the performance literature indicates that small firms have average or superior performance, and that large firms typically take over smaller firms (Levy (1993)). The better performance of small firms can be explained by their incentive structure, shorter decision lags, lower wages, and higher individual risk, or premia (Aiginger and Tichy (1991)). The faster growth of small firms in the 1980s "was fostered by diversification of demand, miniaturization of technology, and a need for flexibility under uncertainty" (Aiginger and Tichy (1991), p. 83).

Second, acquiring small firms incurs smaller integration costs and therefore higher firm values are attainable for the bidders. Changes in CEO compensation after

mergers are positively related to anticipated gains from mergers, and other changes in the compensation structure are hardwired to managerial productivity (Anderson, Becher, and Campbell (2004)). It is natural to assume that the CEO's utility gain from an acquisition increases with the bidder's value gain from the acquisition but decreases with the size of the target because of the disutility of post-acquisition integration costs imposed by larger targets (Goel and Thakor (2010)).

Therefore, we postulate that the CEO of an acquiring firm prefers a smaller target and one with greater value gain to the bidder. Since small targets are associated with higher value gains, they are expected to be acquired earlier in a merger wave. Larger targets that are not initially acquired are likely to be acquired by more envious CEOs in a later stage of the merger wave, when the utility gains of increased compensation from acquiring a bigger target are sufficient to "overcome the higher utility loss associated with integrating a larger target" (Goel and Thakor (2010), p. 499). The previous discussion leads to the following hypotheses.

H2a: Target firms in early acquisitions have a smaller market size than those in late acquisitions.

H2b: The transaction size, both actual and relative, of early acquisitions is smaller than that of late acquisitions.

4.2.3 Early versus Late Bidder Performance

Thus far we have discussed that early bidders, compared with bidders in the late stages of merger waves, are more likely to benefit more from their acquisitions. Therefore, these gains will be reflected on both the early bidders' financial book and stock market values.

H3: Early acquisition bidders experience superior performance compared to late acquisition bidders.

We test this conjecture by examining bidding firms' short-run stock performance using three-day cumulative abnormal returns (CARs) CAR(-1, +1) and long-run stock performance using 12-month buy-and-hold abnormal returns (BHARs) BHAR(+1, +12).[30] This test allows us to see whether the market's initial reaction is

[30] As in Essay I, CARs and BHARs are calculated using the market model. When CARs and BHARs are calculated using the Fama–French three-factor model, we find similar results

consistent with the bidders' long-run stock performance. We also analyze long-run fundamental performance using the one-year abnormal return on assets (AROA)[31] of bidders to test whether it is consistent with the stock performance results.

4.2.4. Early versus Late Synergy

At the early stage of the merger wave, there is less competition and more target options are available to bidders. Hence, early bidders are more likely to pick those targets that bring them higher merger gains. Consequently, we conjecture that early acquisitions are more likely to be associated with greater synergies.

H4: Synergies are greater in early acquisitions than in late acquisitions.

Value changes on the stock market around announcements can be viewed as expected gains from organizational efficiencies, product and geographic diversification, cost savings, and revenue enhancements (Houston and Ryngaert, 1994; DeLong, 2001; Houston, James, and Ryngaert, 2001). Following Anderson, Becher, and Campbell (2004), we measure the expected gains, or synergy, from a merger as the value-weighted change in the market values of the target and bidder banks upon the merger announcement, and find that changes in CEO compensation after mergers are positively related to expected merger gains.

4.2.5. Compensation Changes of Top Management: Early versus Late Bidders

Our analysis predicts that the envy-induced sequential merger decisions of banks will lead to gains from mergers that depend on their timing within the wave. Specifically, the greater synergies of early bidders will lead to higher compensation increases for top managers, who are responsible for the merger decisions. This, then, yields the fifth hypothesis.

H5: The increase in the total compensation of the acquiring firm's CEO and top management team is higher in earlier acquisitions than in later acquisitions.

Mergers typically take shape through the efforts of the entire top management team, who is responsible for the deal-shaping process and experiences an increase in total

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[31] We use the one-year AROA to analyze bidders' long-run fundamental performance. Our construction of the AROA is inspired by Bouwman, Fuller, and Nain (2009), who use abnormal return on operating income to analyze bidders' long-run operating performance. Specifically, we first extract the return on assets (ROA) of each bidder from one year before to one year after the merger completion. Then, we exclude the year of merger completion and use the ROA of the year after the deal minus the ROA of the year before the deal The difference obtained is the AROA, which we use to compare pre- and post-acquisition performance.

compensation from the synergy gains due to the acquisition. Therefore, as in Goel and Thakor (2010), we examine the increase in the total compensation of the top management team rather than that of just the CEO.

4.3 Methodology

4.3.1 Measuring Waves

Harford (2005) classifies an industry as undergoing a merger wave if, during a two-year window, the industry experiences its highest 24-month concentration of merger bids that decade, exceeding the 95th percentile of the simulated distribution.[32] Yan (2009) identifies waves using the concentration, or clusteredness, of contemporaneous same-industry mergers and acquisitions activity. The author calculates the seven-month (three months prior to three months after the announcement month) number of horizontal mergers in the same industry and normalizes this number by the total number of mergers in that industry to measure clusteredness.

Bouwman, Fuller, and Nain (2009) and Goel and Thakor (2010) classify a month as a merger wave month based on the price-to-earnings ratio (P/E) of the Standard & Poor's (S&P) 500 and the market-to-book ratio (M/B) of the overall stock market.[33] Specifically, they "detrend the market P/E by removing the best straight-line fit from the P/E of the month in question and the five preceding years" (Bouwman, Fuller, and Nain (2009), p. 639). If the detrended market P/E of that month is above (below) this past five-year average, it is categorized as above (below) average and the above-average months are then classified as high-valuation (low-valuation) markets.[34]

Since this study concentrates on the banking industry, the market P/E and M/B may not appropriately describe the valuation condition of a single industry.[35] Instead

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[32] Harford (2005) calculates the highest 24-month concentration of mergers for each industry and identifies two 24-month merger waves for the bank industry, one beginning in August 1985 and the other in October 1996

[33] The literature shows more stock return dispersion in bullish markets than bear markets (Ang and Chen (2002), Hong, Tu, and Zhou (2007)), that is, correlations between U S stocks and the aggregate U S market are much greater for downside moves than for upside moves As Goel and Thakor (2010) claim, this disparity in stock movement make it easier for bidders to acquire in a bull market

[34] Goel and Thakor (2010) define high- and low-valuation markets as merger wave months and treat each month as a separate wave We contend that merger clusteredness is continuous and that it is more appropriate to treat continuous wave months as a single wave

[35] We also check the availability of the P/E of the S&P 500 banking subgroup and find that it is not available until 1994 Because the Global Industry Classification Standard was not introduced until the 1990s and this industry

of using the monthly P/E, we directly use the monthly number of mergers to describe merger clusteredness. Following Bouwman, Fuller, and Nain (2009), we detrend the monthly number of mergers and acquisitions by removing the best straight-line fit from *t*, the month in question, and the five preceding years. A month is categorized as above (below) average if the detrended number of mergers that month is positive (negative),[36] which means the monthly volume of mergers is above (below) the five-year best straight-line fit (see Appendix C). Figure 4.1 plots the monthly merger bid volume in the U.S. banking industry from 1985 to 2006, as well as the detrended monthly merger volume. The months with positive detrended monthly mergers are defined as merger wave months, and continuous merger wave months are counted as a single merger wave. The graph shows wave months clustered in the late 1980s, the mid-1990s and 2000s, with the mid-1990s exhibiting the most salient merger activity. In our empirical analysis, each merger wave is evenly divided into 10's according to timeline. Early acquisitions are alternatively tested using the first 10%, 20%, 30%, 40%, or 50% of deals announced in each merger wave.

4.3.2 Data Construction

The original data on U.S. bank takeover bids are the same as in Essay I, obtained from the Thomson One Banker Database (SDC) for the period January 1985 to December 2006 and originally including 2148 complete deals.[37] Based on our wave classification, we only include deals meeting the following criteria:

1. The bidder is a U.S. listed bank acquiring at least 50% of the target bank's shares.
2. The deal value exceeds $2 million.
3. The deal was announced during the bank merger wave periods defined above.

Table 4.1 shows summary statistics for the number of early and late acquisitions announced during bank merger waves using our five alternative definitions of early acquisitions (the first 10%, 20%, 30%, 40%, or 50% of all deals announced during each merger wave in the timeline), based on our merger wave

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was not defined by S&P in the 1980s, we are unable to create a constituent list to calculate the P/E for this industry back in the 1980s

[36] We also use four other estimation periods (three months, six months, one year, and three years) to calculate the detrended monthly number of mergers. Our empirical results are robust to different classified waves.

[37] In these 2148 deals, the bidding firms' stocks are all traded on the New York Stock Exchange, American Stock Exchange, or NASDAQ, with data from the Center for Research in Security Prices available around the announcement (see Table I in Essay I).

classification method. The total number of qualified acquisitions announced during merger waves equals 598.

To test the compensation changes for top managers, we retrieve the total compensation (item *TDC1*) of bidders from Compustat's ExecuComp database, which has data from 1992 to 2008. Total compensation includes salary, bonus, other annual pay, the total value of restricted stock granted that year, the Black–Scholes value of stock options granted that year, long-term incentive payouts, and all other total compensations.

4.4 Empirical Results

4.4.1 Early versus Late Bidders

We first test whether bidders who announce acquisitions earlier during merger waves have similar market capitalization as bidders who announce acquisitions later. A difference-in-means test is used for this purpose. Panel A of Table 4.2 reports the difference in mean size of late and early bidders. The results clearly support the prediction of H1, which postulates that early bidders are not significantly different from late bidders in firm size. For example, if we define early acquisitions as the first 10% of all acquisitions announced during merger waves and the remaining ones as late acquisitions, the mean market capitalization is $4.74 billion for early bidders and $3.09 billion for late bidders—not significantly bigger. If, instead, we define early acquisitions as the first 20% to 50%, the results remain insignificant based on bidder firm size. In sum, this result suggests that early bidders are more likely to motivate envy-based mergers by late bidders in an attempt to keep up with the increasing size change of their early bidding peers.

4.4.2 Early versus Late Target (Transaction)

Panel A of Table 4.2 reports the mean size of late and early targets. The prediction that early target banks are smaller than late target banks (H2a) is generally supported. When we define early acquisitions as the first 20% (30%) of all acquisitions announced during merger waves, the mean market capitalization is $210.496 million ($229.166 million) for early targets, significantly smaller than for late targets, whose mean size is $636.06 million ($662.358 million).

Panel B of Table 4.2 reports both the mean actual transaction size and relative transaction size of late and early acquisitions. Our prediction that the early transaction

value is smaller than the late transaction value (H2b) is better supported when the transaction value is measured by relative size. With all five alternative classifications of merger waves, the relative size of late deals is always significantly larger than that of early acquisitions, whereas the actual size of late acquisitions is tenuously larger than the early ones. For example, if we define early acquisitions as the first 10%, the actual size of late acquisitions is $170.748 million more than the actual size of early acquisitions, and the relative size of late deals is 6.513% larger than that of early acquisitions, which is statistically significant at 5%.

Overall, target banks in early acquisitions have smaller market capitalization than those in the late acquisitions, and early acquisition transactions are smaller than late acquisition transactions, especially when the transactions are measured by relative size.

4.4.3 Early versus Late Bidder Performance

Table 4.3 reports the bidders' mean three-day CARs, 12-month post-acquisition BHARs, and one-year AROAs. The prediction of our third hypothesis (H3), that early acquisition bidders experience superior performance relative to late acquisition bidders, gains stronger support in the long term than in the short term (weakly supported). With all five alternative classifications of merger waves, the CARs of early bidders are tenuously larger than those of late bidders. However, the BHARs of early bidders are significantly larger than those of late bidders when early acquisitions are defined as either the first 20% or the first 30% of all acquisitions announced during merger waves. Similarly, the one-year AROA of early bidders is significantly larger than that of late bidders when early acquisitions are defined as either the first 40% or 50% of all acquisitions announced during merger waves. Thus, we can conclude that early bidders perform better than later bidders after acquisition completion.

Table 4.4 provides multivariate regressions of short-term (CARs) and long-term (one-year BHARs and one-year AROAs) performance measures on *Early Acquisition,* controlling for other effects. Year fixed effects are controlled in all the multivariate regressions. Testing how bidder performance is related to *Early Acquisition*, we find that the *Early Acquisition* binary variable has a tenuous positive influence on three-day CARs and one-year AROAs. However, still eight out of the 10 coefficients of *Early Acquisition* are tenuously positive, which is consistent with our

conjecture. The impact of *Early Acquisition* is ambiguous when we focus on one-year BHARs. Since the literature shows the average post-acquisition returns of bidders are negative, which is a salient feature of mergers since the 1980s (e.g., You, Caves, Smith, and Henry (1986), Varaiya and Ferris (1987), Byrd and Hickman (1992), Andrade, Mitchell, and Stafford (2001)), the results of Table 4.4 show that early bidders perform fairly well. Overall, the multivariate results weakly support our third hypothesis concerning bidder performance in both the short term and long term.

4.4.4 Early versus Late Synergy

Consistent with the fourth hypothesis (H4), which conjectures that early acquisitions realize greater synergies than late acquisitions, Table 4.5 reports that early acquisitions, indeed, experience greater synergies than late ones. Specifically, in five alternative regressions, the coefficients of *Early Acquisition* are all significantly positive, showing the stock market expects higher gains from deals in the early stage of waves. This is consistent with the conjecture that the CEOs of early bidders are likely to gain more private benefits than the CEOs of late bidders, so the CEOs of other banks in the same cohort become more envious and make acquisitions even when synergy is low.

4.4.5 Compensation Changes of Top Management: Early versus Late Bidders

To test our last hypothesis (H5), which predicts that the increase in the total compensation of the CEO and top management team of acquiring banks is higher in earlier acquisitions than in later acquisitions, we calculate the average total compensation of the bidder's top management team in the year before the acquisition announcement and two years after the announcement, and test the percentage increase in mean total compensation. Panel A of Table 4.6 repots the mean percentage change in the top management compensation of early and late bidders. Specifically, with three out of five alternatives, the early bidders experience significantly greater increases in compensation than the late bidders.

Furthermore, we regress compensation changes and synergies of acquisitions announced in merger waves on an early acquisition dummy and control variables. All regressions include year fixed effects. Multivariate results from Panel B of Table 4.6 also provide evidence consistent with our conjecture that the increase in top

management compensation is greater for deals announced earlier in a wave than for those announced later. Controlling for relative deal size and payment method, the coefficients of *Early Acquisition* are significantly positive in three out of five regressions.

In sum, our final hypothesis, that compensation increases are higher in earlier acquisitions than in later acquisitions, is supported by the data.

4.5 Conclusion

The literature shows that envy is deeply rooted in human nature and everyone wants to "keep up with the Joneses." We conjecture that the envious psychology of bank CEOs will affect their investment decisions; specifically, they become envious and rush into acquisitions once other CEOs in their group initiate one. In this way, acquisitions correlate with each other, and merger waves come into being.

Five empirical predictions are put forward and generally supported with evidence. Specifically, the market capitalization of bidders that acquire banks during the early phases of merger waves is not significantly different from that of bidders that acquire target banks later. The target banks in earlier acquisitions in a merger wave are smaller than those in later acquisitions in the wave, and the transaction value of the earlier deals is smaller than that of the later deals. In addition, the earlier mergers in a wave have slightly higher bidder returns than later mergers, as well as significantly larger BHARs and increases in ROA. Moreover, earlier acquisitions in a merger wave lead to greater increases in top management compensation than later acquisitions, and display significantly higher synergies.

Overall, our analysis provides evidence for the main conjecture that envy among bank CEOs can generate bank merger waves even when the economic shock that initiates the wave is purely idiosyncratic to the first firm in the wave. We view envy as a key driving force behind bank merger waves.

Appendix C
Statistics for U.S. Banking Merger Bids during 1980–2006

This table reports the monthly number of merger bids in the U S banking industry during 1980–2006 and the five-year detrended number of monthly mergers during 1986–2006 Each number of monthly mergers is detrended by removing the best straight-line fit from *t*, the month in question, and the five preceding years

Date	# of Monthly Mergers	5-Year Detrended Monthly Mergers	Date	# of Monthly Mergers	5-Year Detrended Monthly Mergers	Date	# of Monthly Mergers	5-Year Detrended Monthly Mergers	Date	# of Monthly Mergers	5-Year Detrended Monthly Mergers
Jan-80	0		Oct-86	31	2 759	Jul-93	55	-5 231	Apr-00	34	-12 804
Feb-80	0		Nov-86	25	-3 608	Aug-93	72	12 736	May-00	36	-8 588
Mar-80	0		Dec-86	33	4 358	Sep-93	51	-8 157	Jun-00	31	-12 205
Apr-80	0		Jan-87	32	2 535	Oct-93	57	-0 899	Jul-00	37	-5 636
May-80	1		Feb-87	26	-4 128	Nov-93	63	6 149	Aug-00	43	1 884
Jun-80	0		Mar-87	33	2 880	Dec-93	68	11 687	Sep-00	40	-1 261
Jul-80	0		Apr-87	31	0 344	Jan-94	54	-2 706	Oct-00	45	4 515
Aug-80	0		May-87	23	-8 096	Feb-94	41	-15 086	Nov-00	27	-13 478
Sep-80	0		Jun-87	24	-7 010	Mar-94	72	17 843	Dec-00	30	-9 539
Oct-80	0		Jul-87	32	1 021	Apr-94	64	9 165	Jan-01	38	-0 477
Nov-80	1		Aug-87	25	-6 433	May-94	73	18 346	Feb-01	28	-10 263
Dec-80	1		Sep-87	31	-0 216	Jun-94	60	4 868	Mar-01	47	10 111
Jan-81	1		Oct-87	78	46 241	Jul-94	77	22 033	Apr-01	26	-10 662
Feb-81	3		Nov 87	45	9 897	Aug-94	54	-1 601	May-01	33	-3 237
Mar-81	2		Dec-87	52	15 865	Sep-94	65	9 593	Jun-01	47	11 667
Apr-81	8		Jan-88	34	-3 683	Oct-94	80	24 497	Jul-01	37	2 089
May-81	3		Feb-88	23	-14 933	Nov-94	73	15 975	Aug-01	39	3 892
Jun-81	7		Mar-88	25	-12 066	Dec-94	74	16 546	Sep-01	37	2 088
Jul-81	12		Apr-88	19	-18 001	Jan-95	72	13 820	Oct-01	32	-2 828
Aug-81	14		May-88	19	-17 183	Feb-95	81	22 125	Nov-01	27	-7 316
Sep-81	12		Jun-88	17	-18 427	Mar-95	81	21 277	Dec-01	22	-11 412
Oct-81	8		Jul-88	18	-16 533	Apr-95	75	14 316	Jan-02	20	-11 522
Nov-81	11		Aug-88	12	-21 668	May-95	93	31 250	Feb-02	22	-7 870
Dec-81	19		Sep-88	22	-10 574	Jun-95	123	58 405	Mar-02	20	-8 321
Jan-82	17		Oct-88	18	-14 055	Jul-95	80	8 651	Apr-02	22	-4 354
Feb-82	10		Nov-88	23	-8 015	Aug-95	114	41 894	May-02	22	-3 099
Mar-82	13		Dec-88	42	11 634	Sep-95	90	13 664	Jun-02	19	-4 708
Apr-82	15		Jan-89	41	9 896	Oct-95	100	21 053	Jul-02	41	18 433
May-82	16		Feb-89	29	-2 942	Nov-95	105	23 310	Aug-02	26	3 335
Jun-82	16		Mar-89	45	12 947	Dec-95	92	6 480	Sep-02	24	2 867
Jul-82	15		Apr-89	37	3 742	Jan-96	98	10 555	Oct-02	26	5 977
Aug-82	10		May-89	40	6 102	Feb-96	81	-8 055	Nov-02	21	1 547
Sep-82	21		Jun-89	48	13 490	Mar-96	75	-15 071	Dec-02	20	2 289
Oct-82	12		Jul-89	39	3 415	Apr-96	108	17 381	Jan-03	33	16 222
Nov-82	12		Aug-89	61	24 918	May-96	77	-15 503	Feb-03	15	-1 510
Dec-82	15		Sep-89	48	9 670	Jun-96	62	-30 376	Mar-03	33	17 916
Jan-83	14		Oct-89	61	21 902	Jul-96	98	6 636	Apr-03	33	18 350
Feb-83	4		Nov-89	44	3 114	Aug-96	80	-14 233	May-03	37	22 194
Mar-83	24		Dec-89	52	10 810	Sep-96	85	-9 557	Jun-03	22	6 995
Apr-83	14		Jan-90	56	13 255	Oct-96	80	-15 868	Jul-03	44	29 411
May-83	16		Feb-90	44	0 201	Nov-96	76	-20 473	Aug-03	34	18 282

Jun-83	16		Mar-90	49	5 089	Dec-96	55	-41 150	Sep-03	35	18 289
Jul-83	15		Apr-90	65	20 454	Jan-97	64	-30 058	Oct-03	31	12 658
Aug-83	20		May-90	82	35 841	Feb-97	61	-31 602	Nov-03	30	10 434
Sep-83	17		Jun-90	137	88 210	Mar-97	51	-40 216	Dec-03	32	12 231
Oct-83	10		Jul-90	47	-8 185	Apr-97	66	-23 908	Jan-04	34	14 229
Nov-83	12		Aug-90	83	27 474	May-97	60	-29 349	Feb-04	35	14 577
Dec-83	16		Sep-90	84	25 804	Jun-97	71	-16 398	Mar-04	36	14 706
Jan-84	22		Oct-90	69	8 271	Jul-97	62	-24 729	Apr-04	35	12 823
Feb-84	25		Nov-90	92	29 807	Aug-97	43	-42 388	May-04	29	5 471
Mar-84	26		Dec-90	63	-1 971	Sep-97	58	-25 387	Jun-04	30	5 731
Apr-84	26		Jan-91	44	-22 323	Oct-97	68	-13 689	Jul-04	30	5 418
May-84	20		Feb-91	62	-3 909	Nov-97	42	-38 776	Aug-04	21	-4 318
Jun-84	19		Mar-91	61	-5 836	Dec-97	66	-11 747	Sep-04	30	4 631
Jul-84	21		Apr-91	37	-30 431	Jan-98	58	-18 979	Oct-04	27	0 915
Aug-84	30		May-91	42	-24 536	Feb-98	58	-17 629	Nov-04	18	-8 300
Sep-84	14		Jun-91	47	-19 029	Mar-98	50	-23 716	Dec-04	32	5 908
Oct-84	20		Jul-91	90	23 920	Apr-98	66	-5 557	Jan-05	15	-11 772
Nov-84	12		Aug-91	52	-16 806	May-98	58	-12 920	Feb-05	17	-8 753
Dec-84	34		Sep-91	72	2 924	Jun-98	68	-1 219	Mar-05	11	-14 144
Jan-85	13	-11 740	Oct-91	62	-8 128	Jul-98	68	-0 272	Apr-05	29	4 652
Feb-85	11	-13 383	Nov-91	44	-26 744	Aug-98	82	14 563	May-05	26	1 575
Mar-85	18	-5 871	Dec-91	35	-34 897	Sep-98	96	27 891	Jun-05	24	-0 380
Apr-85	17	-6 806	Jan-92	37	-31 698	Oct-98	89	20 038	Jul-05	24	-0 044
May-85	16	-7 645	Feb-92	46	-21 594	Nov-98	59	-10 481	Aug-05	28	4 070
Jun-85	22	-1 423	Mar-92	68	1 129	Dec-98	48	-20 157	Sep-05	22	-2 315
Jul-85	26	2 460	Apr-92	60	-7 827	Jan-99	62	-4 281	Oct-05	26	1 780
Aug-85	25	1 113	May-92	32	-36 119	Feb-99	65	0 118	Nov-05	27	2 403
Sep-85	22	-2 123	Jun-92	49	-17 216	Mar-99	62	-1 215	Dec-05	20	-4 443
Oct-85	23	-1 117	Jul-92	48	-17 466	Apr-99	76	13 608	Jan-06	17	-6 927
Nov-85	19	-5 140	Aug-92	66	1 114	May-99	68	5 760	Feb-06	20	-3 508
Dec-85	37	13 107	Sep-92	45	-20 235	Jun-99	52	-9 849	Mar-06	20	-2 975
Jan-86	24	-0 815	Oct-92	49	-15 324	Jul-99	63	3 056	Apr-06	40	16 879
Feb-86	29	4 191	Nov-92	39	-26 303	Aug-99	59	-0 382	May-06	28	4 090
Mar-86	23	-2 168	Dec-92	58	-6 508	Sep-99	59	1 229	Jun-06	31	6 879
Apr-86	28	2 953	Jan-93	57	-8 235	Oct-99	49	-7 537	Jul-06	39	13 969
May-86	30	4 565	Feb-93	41	-24 255	Nov-99	53	-2 172	Aug-06	22	-4 150
Jun-86	37	11 253	Mar-93	50	-13 784	Dec-99	50	-3 881	Sep-06	29	2 797
Jul-86	32	5 380	Apr-93	63	0 048	Jan-00	33	-19 459	Oct-06	27	0 318
Aug-86	37	9 716	May-93	48	-14 734	Feb-00	40	-9 875	Nov-06	23	-3 866
Sep-86	22	-6 317	Jun-93	51	-10 442	Mar-00	45	-3 138	Dec-06	28	1 384

Table 4.1
Summary Statistics on Early versus Late Acquisitions in Merger Waves

This table reports the number of early and late acquisitions announced during merger wave under five alternative definitions of *Early Acquisitions* The sample period is from January 1985 to December 2006

Each month from Jan 1985 to Dec 2006 is classified as a merger wave month if the detrended monthly volume of mergers is positive (refer to Appendix C) The continuous merger wave months are counted as one merger wave

Each merger wave is evenly divided into tens according to timeline Early acquisitions are the first 10%, 20%, 30%, 40%, or 50% of deals announced in each merger wave The remaining deals are classified as late acquisitions

Percentage of deals classified as early acquisitions	10%	20%	30%	40%	50%
Number of deals					
Early acquisitions	67	124	180	223	274
Late acquisitions	531	474	418	375	324
All acquisitions	598	598	598	598	598

Table 4.2
Bidder (Target) Size and Transaction Value of Bidders

This table reports market capitalization (size) of late and early bidders/targets (Panel A), actual deal size and relative deal size of late and early acquisitions (Panel B), CAR(-1, +1), BHAR(+1, +12) and 1Y - AROA for late and early bidders (Panel C), as well as the differences between groups ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

Panel A: Changes of Bidder (Target) Size: Early Acquisitions vs. Late Acquisitions

Panel A reports the mean size of late and early bidders/targets, as well as the difference of two groups The mean size is the market firm value measured in $ million one month prior to that transaction

	Percentage of Deals Classified as Early Acquisitions	10%	20%	30%	40%	50%
(1)	Mean Size of Early Bidders	4739 955	4803 524	3467 027	3413 489	3710 479
(2)	Mean Size of Late Bidders	3085 086	3068 364	3214 224	3199 433	2962 457
	Difference (2) - (1)	-1654 869	-1735 16	-252 803	-214 056	-748 022
	t-value	[-0 704]	[-1 021]	[-0 210]	[-0 194]	[-0 729]
(3)	Mean Size of Early Targets	391 216	210 496	229 166	462 617	461 777
(4)	Mean Size of Late Targets	585 331	636 06	662 358	620 116	646 515
	Difference (4) - (3)	194 115	425 564*	433 192*	157 499	184 738
	t-value	[0 581]	[1 825]	[1 893]	[0 678]	[0 752]

Panel B: Changes of Transaction Deal Values: Early Acquisitions vs. Late Acquisitions

Panel B reports the mean actual deal size and mean relative deal size of late and early acquisitions, as well as the difference of two groups The actual deal value is measured in $ million Relative transaction size is defined as the transaction deal value divided by the market value of equity of the bidders at the end of the month prior to the acquisition announcement

	Percentage of Deals Classified as Early Acquisitions	10%	20%	30%	40%	50%
(1)	Actual Deal Size for Early Acquisitions	165 748	303 489	241 31	231 23	251 406
(2)	Actual Deal Size for late Acquisitions	336 496	320 996	350 116	368 588	373 146
	Difference (2) - (1)	170 748	17 507	108 806	137 358	121 74
	t-value	[1 151]	[0 084]	[0 619]	[0 797]	[0 700]
(3)	Relative Deal Size for Early Acquisitions	12 271%	14 266%	13 221%	14 544%	14 461%
(4)	Relative Deal Size for Late Acquisitions	18 784%	19 042%	20 010%	20 009%	20 831%
	Difference (4) - (3)	6 513%**	4 776%*	6 789%***	5 465%**	6 370%***
	t-value	[2 093]	[1 922]	[2 961]	[2 392]	[2 723]

Table 4.3
Performance of Bidders: Early Acquisitions vs. Late Acquisitions

This table reports the mean *CAR(-1, +1), BHAR(+1 +12)* and *1Y - AROA* for late and early bidders, as well as the difference of two groups *CAR(-1, +1)* is the bidders' 3-day cumulative abnormal return around the announcement *BHAR(+1, +12)* is the bidders' 12-month buy-and-hold abnormal returns after the announcement *1Y – AROA* is the bidders' 1 year abnormal return-on-assets after the announcement. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

	Percentage of Deals Classified as Early Acquisitions	10%	20%	30%	40%	50%
(1)	CAR(-1, +1) for Early Bidders	-0 310%	-0 108%	-0 049%	-0 252%	-0 429%
(2)	CAR(-1, +1) for Late Bidders	-0 520%	-0 598%	-0 689%	-0 642%	-0 553%
	Difference (2) - (1)	-0 210%	-0 490%	-0 640%*	-0 390%	-0 124%
	t-value	[-0 572]	[-1 231]	[-1 695]	[-1 080]	[-0 350]
(3)	BHAR(+1, +12) for Early Bidders	-9 105%	-4 319%	-6 449%	-7 705%	-9 155%
(4)	BHAR(+1, +12) for Late Bidders	-9 493%	-10 796%	-10 742%	-10 494%	-9 702%
	Difference (4) - (3)	-0 388%	-6 477%**	-4 293%*	-2 789%	-0 547%
	t-value	[-0 194]	[-2 411]	[-1 696]	[-1 143]	[-0 227]
(5)	1Y - AROA for Early Bidders	0 078%	0 044%	0 041%	0 055%	0 064%
(6)	1Y - AROA for Late Bidders	-0 013%	-0 014%	-0 022%	-0 036%	-0 054%
	Difference (6) - (5)	-0 09%	-0 06%	-0 06%	-0 091%**	-0 118%***
	t-value	[-1 093]	[-1 066]	[-1 380]	[-2 059]	[-2 706]

Table 4.4
OLS Regressions CARs, BHARs and AROAs

This table reports ordinary least square regression results We regress three-day CARs, 1-year BHARs, and 1Y-AROAs of acquisitions announced in merger waves on an early acquisition dummy and control variables All regressions include year fixed effects *Early acquisition* is a dummy variable, which equals to 1 if the acquisition happened in the first 10%, 20%, 30%, 40%, or 50% in the merger wave, and equals to 0 otherwise

Control variables include *Relative Size*—the transaction value divided by the market value of equity of the bidder at one month prior to the acquisition announcement, *Stock*—a dummy variable that equals 1 if the acquisition was paid for in stock, Friend—a dummy variable that equals 1 if the acquisition was a friendly offer CAR(-1, +1) is the bidders' 3-day cumulative abnormal return around the announcement *BHAR(+1, +12)* is the bidders'12-month buy-and-hold abnormal returns after the announcement *1Y – AROA* is the bidders' 1 year abnormal return-on-assets after the announcement

Numbers in parentheses are *t*-statistics ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

Panel A: Regression on CAR

Dependent Variable	Car(-1, 1)				
Percentage of Deals Classified as Early Acquisitions	10 00%	20 00%	30 00%	40 00%	50 00%
C	0 025	0 025	0 025	0 025	0 026
	[0 643]	[0 648]	[0 639]	[0 648]	[0 655]
Early Acquisition	0 006	0 001	0 003	0 001	-0 001
	[0 887]	[0 026]	[0 644]	[0 141]	[-0 329]
Relative Size	-0 007	-0 007	-0 007	-0 007	-0 007
	[-1 397]	[-1 387]	[-1 408]	[-1 391]	[1 370]
Stock	-0 008	-0 009	-0 008	-0 009	-0 009
	[-1 448]	[-1 486]	[-1 435]	[-1 476]	[-1 510]
Friend Dummy	-0 025	-0 024	-0 025	-0 024	-0 024
	[-0 634]	[-0 625]	[-0 636]	[-0 628]	[-0 613]
Year Fixed Effects	Y	Y	Y	Y	Y
Observations	414	414	414	414	414
Adjusted R^2	0 000	-0 002	-0 001	-0 002	-0 002

Table 4.4 (continued)

Panel B: Regression on BHAR

Dependent Variable	BHAR(+1, +12)				
Percentage of Deals Classified as Early Acquisitions	10 00%	20 00%	30 00%	40 00%	50 00%
C	-0 450*	-0 456*	-0 453*	-0 452*	-0 452*
	[-1 665]	[-1 687]	[-1 674]	[-1 672]	[-1 671]
Early Acquisition	-0 038	0 034	0 008	-0 003	-0 012
	[-0 851]	[0 921]	[0 232]	[-0 100]	[-0 399]
Relative Size	-0 016	-0 017	-0 017	-0 016	-0 016
	[-0 440]	[-0 463]	[-0 457]	[-0 447]	[-0 445]
Stock	-0 089**	-0 087**	-0 087**	-0 088**	-0 089**
	[-2 079]	[-2 020]	[-2 022]	[-2 043]	[2 066]
Friend Dummy	0 275	0 27	0 271	0 273	0 277
	[1 022]	[1 004]	[1 007]	[1 014]	[1 028]
Year Fixed Effects	Y	Y	Y	Y	Y
Observations	384	384	384	384	384
Adjusted R^2	0 313	0 314	0 312	0 312	0 312

Panel C: Regression on AROA

Dependent Variable	1Y_AROA				
Percentage of Deals Classified as Early Acquisitions	10 00%	20 00%	30 00%	40 00%	50 00%
C	0 137	0 149	0 143	0 145	0 144
	[0 382]	[0 415]	[0 401]	[0 406]	[0 404]
Early Acquisition	0 067	-0 001	0 032	0 035	0 072
	[0 988]	[-0 017]	[0 641]	[0 747]	[1 547]
Relative Size	-0 005	-0 001	-0 002	-0 002	-0 006
	[-0 082]	[-0 022]	[-0 040]	[-0 031]	[-0 106]
Stock	-0 079	-0 078	-0 074	-0 072	-0 065
	[-0 977]	[-0 966]	[-0 909]	[-0 878]	[-0 796]
Friend Dummy	-0 497	-0 496	-0 503	-0 507	-0 521
	[-1 414]	[-1 409]	[-1 429]	[-1 439]	[-1 486]
Year Fixed Effects	Y	Y	Y	Y	Y
Observations	258	258	258	258	258
Adjusted R^2	0 148	0 145	0 146	0 147	0 153

Table 4.5
OLS Regressions on Synergies

This table reports ordinary least square regression results We regress synergies and compensation changes of acquisitions announced in merger waves on an early acquisition dummy and control variables. All regressions include year fixed effects. *Early acquisition* is a dummy variable, which equals to 1 if the acquisition happened in the first 10%, 20%, 30%, 40%, or 50% in the merger wave, and equals to 0 otherwise

Control variables include: *Relative Size*—the transaction value divided by the market value of equity of the bidder at one month prior to the acquisition announcement; *Stock*—a dummy variable that equals 1 if the acquisition was paid for in stock, Friend—a dummy variable that equals 1 if the acquisition was a friendly offer *2Y Comp-Change* equals to the "total compensation" of the top management 2-year after the merger announcement over that of the year before the announcement minus 1. *Synergy [-1,+1]* is defined as weighted sum (by market capitalization) of the bidder and target cumulative abnormal announcement returns following Bradley, Desai, and Kim (1988). *Synergy[-1,+1]* equals to ($ACAR[-1,+1] + $TCAR[-1,+1]) / (BidderMCAP[-2] + (1- Toehold) × TargetMCAP[-2]). $ACAR[-1,+1] refers to change of bidding bank stockholders' wealth; $TCAR[-1,+1] refers to change of target bank stockholders' wealth during window [-1,+1], (BidderMCAP[-2] + (1- Toehold) × TargetMCAP[-2]) refers to the combined market value of bidder and target.

Numbers in parentheses are *t*-statistics ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable	Synergy(-1, 1)				
Percentage of Deals Classified as Early Acquisitions	10.00%	20.00%	30 00%	40 00%	50 00%
C	0.009	-0 001	0.002	0.002	0 002
	[0.070]	[-0.012]	[0 013]	[0.020]	[0.020]
Early Acquisition	0.071*	0 072**	0 074***	0.101***	0 129***
	[1 860]	[2 544]	[2.853]	[4 686]	[7 024]
Relative Size	0.005	-0.002	-0.003	-0.007	0 001
	[0 205]	[-0.059]	[-0 134]	[-0 289]	[0.022]
Stock	0 006	0.004	0.004	-0.004	0 005
	[0 237]	[0 166]	[0.185]	[-0 183]	[0.217]
Friend Dummy	0 022	0.029	0 026	0 023	-0.009
	[0.175]	[0 228]	[0.210]	[0.193]	[-0.082]
Year Fixed Effects	Y	Y	Y	Y	Y
Observations	176	176	176	176	176
Adjusted R^2	-0.068	-0.048	-0.037	0.043	0.171

Table 4.6
Compensation of Top Management: Early Bidders vs. Late Bidders

This table reports the results concerning the compensation of top management, for the bidders Panel A shows the univariate tests, Panel B shows the multivariate tests 2Y Comp-Change equals to the "total compensation" of the top management 2-year after the merger announcement over that of the year before the announcement minus 1

Numbers in parentheses are *t*-statistics ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

Panel A: Compensation Change of Bidders: Early Acquisitions vs. Late Acquisitions

Panel A reports the mean increase in top management compensation of early and late acquisitions, as well as the difference of two groups

	Percentage of Deals Classified as Early Acquisitions	10%	20%	30%	40%	50%
(1)	Mean 2Y Comp-Change of Early Bidders	143 64%	102 95%	99 22%	111 30%	108 57%
(2)	Mean 2Y Comp-Change of Late Bidders	71 27%	76 93%	73 83%	59 06%	57 66%
	Difference (2) - (1)	-72 37%*	-26 02%	-25 39%	-52 25%**	-50 92%**
	t-value	[-1 661]	[-0 837]	[-0 976]	[-2 044]	[-2 039]

Panel B: Regression on Compensation Increase

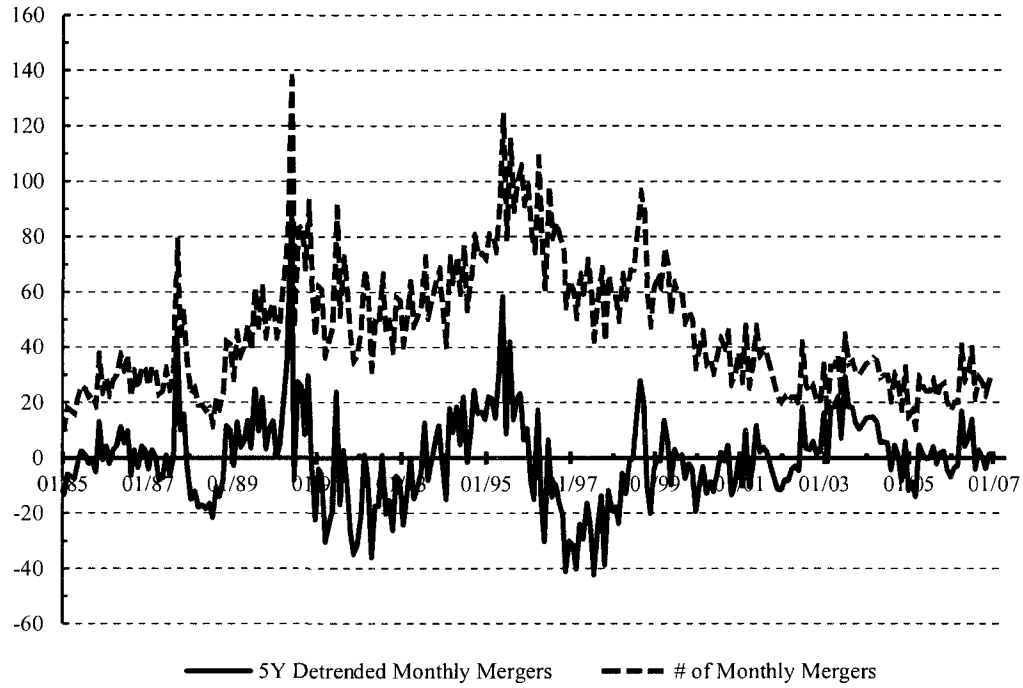
Panel B reports ordinary least square regression results We regress compensation changes of acquisitions announced in merger waves on an early acquisition dummy and control variables All regressions include year fixed effects *Early acquisition* is a dummy variable, which equals to 1 if the acquisition happened in the first 10%, 20%, 30%, 40%, or 50% in the merger wave, and equals to 0 otherwise

Control variables include *Relative Size*—the transaction value divided by the market value of equity of the bidder at one month prior to the acquisition announcement, *Stock*—a dummy variable that equals 1 if the acquisition was paid for in stock, Friend—a dummy variable that equals 1 if the acquisition was a friendly offer

Dependent Variable	2Y Comp-Change				
Percentage of Deals Classified as Early Acquisitions	10 00%	20 00%	30 00%	40 00%	50 00%
C	-0 043	0 112	0 079	-0 014	0 231
	[-0 027]	[0 069]	[0 049]	[-0 009]	[0 148]
Early Acquisition	0 748*	0 053	0 219	0 558*	0 522*
	[1 875]	[0 141]	[0 659]	[1 735]	[1 678]
Relative Size	0 546	0 331	0 424	0 651	0 564
	[0 635]	[0 378]	[0 481]	[0 744]	[0 651]
Stock	-0 687	-0 701	-0 669	-0 631	-0 585
	[-1 628]	[-1 610]	[-1 542]	[-1 482]	[-1 405]
Friend Dummy	1 252	1 342	1 267	1 155	1 059
	[0 796]	[0 836]	[0 790]	[0 731]	[0 671]
Year Fixed Effects	Y	Y	Y	Y	Y
Observations	108	108	108	108	108
Adjusted R^2	-0 030	-0 070	-0 065	-0 036	-0 032

Figure 4.1
Time Series of (Detrended) Monthly Merger Bids

This figure plots the monthly merger bid volume in the U S. banking industry from 1985 to 2006. The numbers correspond to Appendix C. The dashed line shows the monthly volume of merger bids, and the solid line shows the 5-year detrended monthly merger activity. The months with positive detrended monthly mergers are defined as merger wave months



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